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Global Financial Spillovers of Chinese Macroeconomic Surprises

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ABSTRACT: We study how Chinese macroeconomic surprises affect global financial markets. Exploiting forecast errors around key data releases and a 60-minute window around the release, we show that positive industrial production (IP) surprises lead to immediate increases in Chinese and Asia-Pacific stock returns, global long-term yields, and commodity prices highly demanded by China. A complementary identification strategy, which builds on different time zones, confirms positive spillovers to international equity markets, with stronger effects in countries more exposed to Chinese trade. Our results highlight the role of both Hedging Premia and Growth Expectations in driving asset price comovement. The findings highlight China's growing influence in global markets and position it as a driver of the Global Financial Cycle.

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WORKING PAPERS

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Contents

1 Introduction

Asset prices, capital flows, and credit conditions display strong global comovement, a phenomenon known as the Global Financial Cycle (GFC) (Rey, 2013). This synchronization has important implications for monetary and macroprudential policy. While previous research highlights the dominant role of US monetary policy, financial shocks, and macroeconomic surprises in driving the GFC, much less is known about the influence of other large economies.[1] While over the past two decades, China has emerged as a central player in the global economy, there is surprisingly little evidence on whether its macroeconomic news affect financial markets abroad.

This paper studies the effects of Chinese macroeconomic surprises on global financial markets.[2] We construct a novel series of surprises, defined as the difference between the realized values of key Chinese macro indicators and market expectations immediately prior to their release. Through our constructed surprise series, we examine the effects of Chinese macro news on a range of financial variables and asset prices across countries, shedding light on the extent of synchronized global financial markets' response.

We estimate the effects of our series of surprises on Asia-Pacific stock returns, commodity prices, and yields using a 60-minute time window around the release. This narrow window, which considers 30 minutes before and after the release, allows us to isolate the effect of such releases of information from other sources that may potentially affect asset prices. Afterwards, we exploit the fact that Chinese macro announcements are released when stock markets are *closed* in Non-Asian economies (due to time zone differences) to quantify their global effects. For every macro release in China appearing on different days, we contrast stock price indices immediately after the markets open in different economies, relative to

[1] See, for example, Rey (2013), Miranda-Agrippino and Rey (2020), Boehm and Kroner (2025), Rogers et al. (2025).

[2] Throughout the paper, we use the terms macroeconomic surprises and macroeconomic news interchangeably. Because the series captures new information released to market participants, we refer to it as *news* about the state of the economy. Since it is based on the difference between actual releases and expectations, we also refer to it as a *surprise*.

their closing value the day before. Through this natural setup, we complement our baseline identification framework and estimate the effect of such surprises on international asset prices. Finally, we discuss the potential mechanisms by which Chinese macro surprises are transmitted to international markets.

Using our narrow 60-minute time window, we show that Chinese news significantly affect both the local and the Asia-Pacific stock returns. In particular, a 1% positive Industrial Production (IP) surprise induces a positive and significant response of 21 and 3 basis points on average for the Chinese and Asian-Pacific economies, respectively. Likewise, such IP surprise brings an immediate and significant rise of Chinese and US 10-year bond yields right after the announcements, with no meaningful effects on short-term (1-year) yields. In addition, we find that the prices of commodities that are used as intermediate inputs, and for which China accounts for a large share of its global demand, such as Copper, Aluminum, and Oil, also respond promptly and positively to IP surprises. On the contrary, other surprises (related to retail sales, prices, GDP, or international trade) induce a non-significant effect on most of these studied variables.

Turning to our close-to-open setup, we find that higher-than-expected IP news from China brings a sizeable rise in international stock returns. After 1% positive surprise, stock returns rise by an average of 9.5 basis points. Through our large panel of countries, we compute the stock price response for *each* country in our dataset and show that the estimated effect coincides, in terms of sign and magnitude, for most of our selected countries. The fact that surprises coming from a large and important economy such as China bring significant and common responses in stock prices worldwide, naturally connects our paper with the literature of the GFC. We interpret the synchronized response across different economies as suggestive evidence that Chinese IP news can also emerge as an additional and unexplored determinant of the GFC.

To provide further evidence about the relation between Chinese news and the GFC, and using our daily close-to-open identification framework, we study the effects of such surprises

on the VIX Index. The presence of a meaningful response of the VIX is relevant as it is argued that this index is a close proxy for the GFC (see, for example, Rey, 2013; Miranda-Agrippino and Rey, 2020). A positive 1 percentage point surprise in industrial production brings a drop of 0.44% in the VIX index. We complement this finding by assessing the response of the GFC series computed by Miranda-Agrippino et al. (2020), which is available at a monthly frequency. We show that a positive IP surprise induces an increase in the GCF index that lasts approximately three months.

Having stressed the impact of our surprise series, we turn to studying its transmission mechanism. As discussed, positive Chinese macro surprises induce an increase in the Chinese and US long-term yields, coupled with a contemporaneous increase in local and international stock prices. We interpret these results as evidence that the *Hedging Premium* is an important transmission channel (see Cieslak and Pang, 2021). Intuitively, this channel implies that in response to a positive Chinese surprise, investors are willing to take more risk, causing an increase in long-term yields and stock prices. The drop in the VIX index, which is also interpreted as a measure of uncertainty, is also consistent with a higher-risk appetite from investors. Besides the Hedging Premium channel, a further comprehensive assessment of our results leads us to acknowledge that other potential channels are also operating. As discussed, Chinese IP surprises also induce an increase in commodities mostly associated with internal production. Moreover, we show that Chinese surprises induce a stronger effect on stock returns in economies with a larger export share to China and after 2016, consistent with the increasing role of China in world economic activity. We associate these dynamics with the presence of a *Growth Expectations* channel related to Chinese economic activity.

To strengthen our results, we study whether the observed effects are driven by Chinese announcements or merely reflect broader improvements in global growth prospects. We construct macroeconomic surprise series for other G7 economies that are published on the same day as China's. If the asset price responses were capturing global rather than China-specific growth signals, then surprises from these other economies should also generate

significant stock market reactions. We find no statistically significant effects from these alternative series, only Chinese surprises affect stock returns. We also document that the impact of Chinese IP surprises on global stock returns becomes stronger after 2016, the year China overtook the US as the world's largest economy in PPP terms. This trend aligns with China's rising economic prominence in the previous years, especially against the backdrop of relatively stable global GDP growth over the same period.

Our paper contributes to studying the effects of macroeconomic announcements on asset prices. Boyd et al. (2005) show that the stock market significantly responds to the appearance of news about the US unemployment rate. Similarly, Faust et al. (2007) study the response of the value of the US Dollar and the term structure of interest rates following scheduled US macroeconomic announcements. They claim that positive news about real activity in the US lead to higher short and long-term interest rates and a higher value of the dollar. In these matters, the closest paper to ours is Baum et al. (2015), who study the high-frequency effect of Chinese announcements on worldwide financial and commodity markets. They show that news about manufacturing and industrial output significantly affect stock markets, industrial commodities, and their currencies. Our results complement these findings in several ways. First, we assess the potential synchronized response that such news brings to different economies. Second, we characterize the specific features that make countries react more to the Chinese shock than others, highlighting the relevance of the trade dependence of each country, specifically with China. Third, we explore the potential mechanism by which China's surprise affects the rest of the economies. Fourth, we study the persistence and the length of the response on the GFC series after a Chinese IP surprise. All these results allow us to characterize more in detail the transmission of Chinese macro surprises and their relationship with the GFC.

Previous works have analyzed the determinants of the GFC. Rey (2013), Miranda-Agrippino and Rey (2020), Miranda-Agrippino and Rey (2022), and Degasperi et al. (2023) argue that US monetary policy is an important driver of the GFC, inducing strong effects

on international capital flows and changes in global financial conditions. Rogers et al. (2025) show that shocks to US corporate bonds, leverage in US banks, and the US term premium explain a significant fraction of the GFC. Boehm and Kroner (2025) find that the releases of the US macroeconomic indices significantly affect asset prices worldwide. They argue that US surprises have strong effects on different asset prices within a tight window of their release. While Boehm and Kroner (2025) show that the release of different US variables brings effects on stock returns, only IP emerges as the key indicator for China. However, our evidence still complements the existing literature by posing an additional country and type of macro announcement that can affect international prices, above and beyond shocks arising from the US.

Building on the previous argument, there is evidence that GFC is also driven by shocks outside the US. Miranda-Agrippino et al. (2020) and Ferriani and Gazzani (2024) study the spillovers of Chinese monetary policy shocks. While US monetary policy transmits worldwide mainly through asset prices, Chinese monetary policy transmits mainly through commodity prices and international trade. Miranda-Agrippino and Rey (2022) argue that Chinese monetary policy is an important driver of the Global Trade and Commodity cycle. Barcelona et al. (2022) show that policy-induced changes in Chinese domestic credit affect both global financial conditions and global economic activity by affecting global risk sentiment. They show that this shock also has a significant effect on commodity prices. Corneli et al. (2023) estimate the effect of Chinese macroeconomic surprises on asset prices between 2018 and 2022. Our paper is closely related to this last paper, departing from it in important dimensions. First, our analysis covers a longer sample, including the COVID period. Second, we use intradaily data and close-to-open variation of asset prices instead of relying on daily data. Third, our paper not only estimates the effects of macroeconomic surprises but also focuses on the different transmission channels of Chinese macroeconomic surprises.

Our paper complements the growing body of evidence on China's global economic relevance. While much of the existing literature focuses on trade and productivity channels,

we emphasize the immediate financial responses to Chinese news. For instance, Bloom et al. (2021) show that greater Chinese import competition spurred innovation among European firms, ultimately boosting long-run growth in OECD economies. Similarly, Autor et al. (2013) document how rising import competition from China led to higher unemployment and lower labor force participation in the US In a broader macroeconomic framework, Di Giovanni et al. (2014) use a multi-country model to show that China's trade integration and productivity growth generated large welfare gains for most countries, especially when growth is biased toward its comparative disadvantage sectors. Our findings add to this literature by showing that China's economic influence also operates through real-time financial channels, with effects that are heterogeneous and closely tied to countries' trade exposure.

The rest of this paper is organized as follows. Section 2 describes the series of Chinese macroeconomic surprises. Section 3 displays the estimated high-frequency effects of the surprises on asset prices. Section 4 presents the estimated effects of the Chinese macro surprises using close-to-open variation for a broader set of stock returns and the VIX. Section 5 analyzes the transmission channels of Chinese macro surprises. Finally, Section 6 concludes.

2 Series of Chinese Macro Surprises

To assess the effects of Chinese macroeconomic surprises on key macro-financial aggregates, we first describe how we measure surprises along with the data used in their construction.

2.1 Definition

We define a macroeconomic surprise in China, denoted by $s^Y_{CHI_t}$, as follows:

$$s^Y_{CHI_t} = Y_{CHI,t} - \mathbb{E}\left[Y_{CHI,t} \mid \mathcal{I}_{t-\epsilon}\right] \tag{1}$$

where $Y_{CHI,t}$ is the reported value of the macroeconomic indicator Y released in China,

and $\mathbb{E}[Y_{CHI,t} \mid \mathcal{I}_{t-\epsilon}]$ corresponds to the median forecast for variable Y, collected from the Bloomberg survey of professional forecasters. Alternatively, we also use the mean expected value of the variable as a robustness (see Appendix B.1). The information set $\mathcal{I}_{t-\epsilon}$ reflects the most recent available forecasts in the survey. While the time lag between the last recorded forecast in Bloomberg and the publication of the macro variables varies across indicators $t - \epsilon$, on average, the ranges vary from one to two days.

While Corneli et al. (2023) and Boehm and Kroner (2025) divide the forecast error by its standard deviation over the sample, we prefer not to standardize the series to enhance the interpretation of the estimated effects. [3] Through this difference, we ended up with a direct quantitative measure of the magnitude of surprises, interpreted as the (median) unexpected forecast error for any macroeconomic variable Y.

2.2 The Bloomberg Survey

Information about the announced macroeconomic variable Y is obtained from the Bloomberg Economic Calendar Survey for China. For each variable, Bloomberg provides the release date, time, final reported value, and median expectation of surveyed forecasters. Each survey participant can update expectations up to minutes before the release of the variable, considering all the information available up to that moment.

The level of attention to macroeconomic releases varies across both agents and indicators. Some variables are more closely monitored due to their perceived relevance or economic importance. To ensure that our analysis focuses on the most impactful announcements, we rely on Bloomberg's classification of highly relevant macroeconomic indicators. Based on this criterion, we construct macroeconomic surprise measures through equation (1) for the period between January 2006 and December 2024. Table 1 lists the variables included in our analysis.

We intentionally prefer not to aggregate any surprise series to study their potentially

[3] Standardizing the series would only rescale the estimated coefficient without affecting the statistical significance of our results.

Table 1: Bloomberg's Most Relevant Chinese Macro Variables

Announcement	Frequency	Unit	Release Time	Observations
GDP	Quarterly	Year-over-year, % change	10:00	76
Industrial Production	Monthly	Year-over-year, % change	10:00	191
Retail Sales	Monthly	Year-over-year, % change	10:00	192
CPI	Monthly	Year-over-year, % change	09:30	227
PPI	Monthly	Year-over-year, % change	09:30	227
Exports	Monthly	Year-over-year, % change	11:00	216
Imports	Monthly	Year-over-year, % change	11:00	217

Note: This table reports the set of Chinese macroeconomic indicators classified as "highly relevant" by Bloomberg. It includes information on their frequency, unit of measurement, most common release time (Shanghai Time), and the number of observations over the period January 2006 to December 2024. While the stated release time corresponds to the usual schedule, occasional variations may occur.

heterogeneous implications on outcomes, while relying on the highest possible frequency. During some months, Macro announcements in China are scheduled during weekends. However, this is rather infrequent in our data, as shown in Table A.3 in the Appendix, where we separate between announcements scheduled during weekdays relative to weekends. Since financial markets are closed during weekends, we remove such observations from the data.

2.3 Properties of the Surprise Series

We study the properties of the identified series of macro surprises before moving to the main analysis. First, we confirm that the series of macro surprises for the different variables have a mean of 0 and that they are serially uncorrelated. This is important to test for the absence of systematic mistakes and the predictability of the forecast errors. Second, we evaluate if the distributions of macro surprises are symmetric. The time series and the histograms of the macro surprises for each variable are shown in Appendix B. The responses of most of the variables, especially industrial production which is the center of our posterior analysis, satisfy the two properties of zero mean and symmetry.[4]

[4]Beyond their empirical usefulness, the fact that the surprise series are both mean-zero and symmetric helps reducing concerns about measurement issues (see Fernald et al., 2021).

Another important source of concern is whether other economies also publish information within the same day and time frame as China. For this, we check the economic calendars for G7 and Asian economies. Our main analysis is presented in Appendix B.2, where we include Table A.4 with the studied economic calendars. Although we mainly focus on the release of industrial production in China, which is the main measure we use in our empirical analysis below, we also provide evidence using all published indicators. While the probability of joint information releases between this large group of countries and China is practically negligible, such probability is meaningful for some other countries, especially Asian Economies. For instance, the probability that Japan publishes economic information on the same day that China publishes its industrial production figures is 0.47. This probability is also significant for Singapore (0.19), South Korea (0.19), and the United Kingdom (0.13). To assess if this overlap in the appearance of news may affect our analysis, we compute the correlation between the series of Chinese macro surprises and the macro surprises of the economies. We consider both the whole day and a closed-to-open window for the analysis. Chinese surprises are not correlated with any other surprise series of any other country in our sample, with the exception of the UK's macro surprises. With respect to the potential incidence of the UK economy, we show that our main conclusions are robust to controlling for such surprises.

3 High-Frequency Effects

Building on our series of macro surprises, we quantify its effects on different financial variables in high-frequency. First, we describe the empirical specification. Then, we present the estimated effects on variables observed at the intra-day frequency (i.e., in a tight window around the release of Chinese macro surprises).

3.1 Empirical Specification

We estimate the following specification to quantify the response of each variable of interest $\Delta y_{i,\tau}$ to Chinese macro surprises $s^{Y}_{CHI_\tau}$:

$$\Delta y^{hf}_{\tau} = \alpha + \gamma s^{Y}_{CHI_\tau} + \beta X_\tau + \varepsilon_\tau \tag{2}$$

Where $\Delta y^{hf}_{\tau} = y_{\tau+30} - y_{\tau-30}$ accounts for the difference between the variable y_t measured 30 minutes after the macro variable Y is published, relative to its value 30 minutes before $y_{\tau-30}$. Then $s^{Y}_{CHI_\tau}$ is the surprise for variable Y which is known at time τ (e.g, at 10 am as discussed earlier) on any specific day. X_t denotes the controls, which in this case are series of surprises that occur within the same time window. We refer to Appendix D.1 for further specific details on the construction of the intraday narrow 60-minute window around each macroeconomic release. The identification assumption relies on the fact that the surprise series are orthogonal to the error term ε_τ. This implies two main facts. First, as discussed, the Chinese macro surprises $s^{Y}_{CHI_\tau}$ accounts for the non-systematic (unanticipated) part of Chinese releases. Second, that there are no systematic releases of other information within the same time window. The second assumption builds on the previous evidence of Section 2.3. Our narrow time window around the releases helps to satisfy this last assumption.[5] We further validate the chosen length of our studied time window by building on existing evidence that also uses intraday stock information from China. Using minute-by-minute data, Baum et al. (2015) show that there is a large and significant increase in the average trading volume of stocks within the first 30 minutes after China publishes its industrial production figure.

[5]This high-frequency identification strategy has been widely used to estimate the effects of monetary policy on asset prices (see, for example, Kuttner, 2001; Bernanke and Kuttner, 2005; Gurkaynak et al., 2005) and on macroeconomic variables (see, for example, Gertler and Karadi, 2015; Nakamura and Steinsson, 2018; Jarociński and Karadi, 2020). Monetary policy surprises are defined as the change in Fed Funds futures within a thirty-minute window around monetary policy events. This identification strategy has recently been extended to identify other structural shocks, such as oil supply news shocks (see, for example, Känzig, 2021).

3.2 Response of Asia-Pacific Stock Markets

Initially, we explore the effects of macro surprises on the Chinese stock market, and then we lay out the effects for other economies in the Asia-Pacific region. For all these countries, we collect information on stock market returns 30 minutes before and after each announcement. We complement the intraday specification by also analyzing the returns sixty and ninety minutes after the release. Hence, we expand our one-hour time window to an hour and a half and a two-hour window as well. Table A.6 in Appendix C.2 lists all the Asia-Pacific countries that we include in our estimation.

Panel A of Table 2 shows the response of Chinese stock returns using our sixty-minute time window. Each column corresponds to the estimated effect of each type of macro surprise on Chinese stock returns. As noted, the relevance and magnitude of the effects vary depending on the announced indicator. Industrial Production (IP) surprises stand out as the only relevant release, bringing a significant rise of approximately 21 basis points in Chinese returns. Other indicators do not significantly impact local stock returns, not even other activity-related variables such as Retail Sales or the GDP growth rate. It is worth mentioning that, following the Economic Calendar in China, retail sales figures are released simultaneously with IP. For this reason, in all our estimations, we include both surprises together to isolate the effect of IP.

Panel B of Table 2 shows the stock return response for other Asian Pacific countries. Given the (relatively) common time zone, all these countries' stock markets are open when China announces its indicators. We estimate the effect after adding country fixed effects. In particular, we extend equation (1) to account for the panel structure of the data (i.e., $\Delta y^{hf}_{i,\tau} = \alpha_i + \gamma s^{Y}_{CHI_\tau} + \beta X_\tau + \varepsilon_{i,\tau}$ where i represents each country) while using the same time windows. The results confirm the presence of positive spillover effects caused by the Chinese surprise within our narrow one-hour window. A 1 percentage point IP surprise brings a positive effect of roughly 3.4 basis points on Asia-Pacific stock returns. Other releases, such as retail sales and exports, also bring a positive response of approximately 3.9

Table 2: 60-Minute Stock Market Response to Chinese Macroeconomic Surprises

Panel A: China							
	Ind. Prod.	Retail	Exports	Imports	CPI	PPI	GDP
γ	21.16***	5.58	0.89	0.59	10.39	-15.83	30.16
Std. Error	(6.98)	(8.25)	(1.04)	(1.17)	(35.00)	(29.27)	(59.30)
Observations	149	147	150	150	166	166	55
R^2	0.14	0.17	0.05	0.05	0.11	0.11	0.32
Panel B: Asia-Pacific ex. China							
	Ind. Prod.	Retail	Exports	Imports	CPI	PPI	GDP
γ	3.40***	3.88**	0.35**	-0.35	-4.77	1.83	6.83
Std. Error	(1.30)	(1.60)	(0.16)	(0.24)	(6.82)	(6.50)	(16.53)
Observations	1,228	1,228	1,291	1,291	1,209	1,209	462
R^2	0.04	0.05	0.03	0.03	0.03	0.03	0.11

Note: This table reports the cumulative 60-minute stock market response to Chinese macroeconomic surprises. The time window is centered at the announcement, comparing the change 30 minutes after the release relative to 30 minutes before the release. All regressions for the Rest of Asia and Oceania also include country fixed effects. Robust standard errors are reported in parentheses. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

and 0.4 basis points, respectively. Complementing the evidence about the reaction after the release and focusing only on IP surprises, Table 3 shows the response using the ninety and a hundred and twenty minute time window for both Chinese and Asia Pacific stock returns. The positive and strong effect of this variable persists for even one and a half hours after the announcement (120-minute window). For completeness, Table A.8 in Appendix E.1 reports the response for all surprise series using all the countries across the three time windows. For Asia-Pacific countries, the positive effects of retail sales also remain significant ninety minutes after the surprise.

3.3 Sovereign Yields

Although most global stock markets are closed when China releases its macroeconomic indicators (a feature we will exploit in the next section), some financial instruments, particularly sovereign bond yields, continue to trade actively. In regions such as Asia-Pacific and Europe, investors maintain regular bond trading activity regardless of US market hours,

Table 3: Intraday Stock Market Response to Chinese Industrial Production Surprises

	China			Asia-Pacific ex. China		
	Δ_{60}	Δ_{90}	Δ_{120}	Δ_{60}	Δ_{90}	Δ_{120}
IP Surprise	21.16***	20.36***	19.60***	3.40***	4.15***	4.05***
	(6.98)	(7.05)	(6.69)	(1.30)	(1.55)	(1.50)
Observations	149	149	149	1,228	1,228	1,228
R^2	0.14	0.10	0.12	0.04	0.04	0.05

Note: This table reports the cumulative intraday stock return response to Chinese industrial production surprises over 60-, 90-, and 120-minute windows. The time window denotes 30 (Δ_{60}), 60 (Δ_{90}) and 90 (Δ_{120}) minutes after the release relative to 30 minutes before the release. Asia-Pacific ex. China regressions include country fixed effects. Robust standard errors are reported in parentheses. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

ensuring the presence of active pricing mechanisms around the time of the announcements. This allows us to exploit our one-hour time window to capture immediate bond trading reactions. Specifically, we collect data on both short-term (1-year) and long-term (10-year) yields for China and the US Our goal is to assess whether these surprises can generate spillovers in domestic and international yields, providing insights for the transmission of Chinese economic news through global interest rate channels. Table A.10 shows the intraday response using the same three time-windows as in our previous specification. Panel A shows the effects on Yields for China, while Panel B reports them for the US. Given the previous results, we focus on IP surprises exclusively.

Clearly, the sovereign yield responses are highly asymmetric. After a 1 percentage point IP surprise, long-term yields for both China and the US increase by approximately 0.23 and 0.42 basis points, respectively. The effect remains significant and is persistent during the next hour. On the contrary, the effect on the 1-year yield is statistically zero in the two economies for all the time-windows and independently of the country. As shown in Table A.10, data availability differs across countries: Chinese yield data begin in 2018, while U.S. yield data are available from 2013. To address this discrepancy in sample periods, Appendix E.3 presents results using a harmonized sample starting in 2018. Both the magnitude and significance of our findings remain robust.

Table 4: High-Frequency Response of Government Bond Yields to Chinese IP Surprises

Panel A: Chinese Yields						
	1-Year Yield			10-Year Yield		
	Δ_{60}	Δ_{90}	Δ_{120}	Δ_{60}	Δ_{90}	Δ_{120}
IP Surprise	-0.12	-0.15	-0.18	0.23**	0.24**	0.25**
	(0.09)	(0.12)	(0.12)	(0.11)	(0.11)	(0.12)
Observations	39	39	39	64	64	64
R^2	0.24	0.12	0.33	0.25	0.26	0.25
Panel B: United States Yields						
	1-Year Yield			10-Year Yield		
	Δ_{30}	Δ_{60}	Δ_{90}	Δ_{30}	Δ_{60}	Δ_{90}
IP Surprise	0.05	0.06	0.05	0.42***	0.28**	0.29**
	(0.06)	(0.06)	(0.06)	(0.10)	(0.11)	(0.13)
Observations	95	95	95	102	102	102
R^2	0.07	0.08	0.08	0.18	0.09	0.09

Note: This table reports the cumulative effects (in basis points) of Chinese industrial production surprises on short- and long-term government bond yields in China and the US, measured over 60-, 90-, and 120-minute time windows. The time window denotes 30 (Δ_{60}), 60 (Δ_{90}) and 90 (Δ_{120}) minutes after the release relative to 30 minutes before the release. Chinese bond yields refer to local-currency sovereign bonds. Intraday data for Chinese yields are available in Bloomberg only from 2018 onward, while US Treasury intraday data are available from 2013. The number of observations for 1-year yields is occasionally lower, particularly for China, due to differences in market liquidity and data availability. Robust standard errors are reported in parentheses. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

Although we focus on the yield responses after an IP surprise, in Appendix E.2 we show the intraday effects of US short and long rates, using the remaining surprises. In this case, none of the surprises (not even Retail Sales) brings any significant response in either Yield, except for IP on long yields. We further confirm the relevance of IP relative to the other indicators below while studying the worldwide stock market reactions and the VIX Index.

The asymmetric reaction of long relative to short yields is not a particular feature of these two major economies. In Appendix F.2, we complement these findings by repeating the same high-frequency specification but using Bond Yields for Germany and the UK. Consistently, we find a positive reaction of 10-year yields along with a muted reaction of short-term bond yields. Section 5 discusses our preferred interpretation for the heterogeneous yield responses. We prefer to postpone this discussion until later to have a broader and compelling description

of the effect of Chinese surprises, before turning to the potential transmission channels.

3.4 Commodity Prices

Given China's central role in global commodity markets, particularly as a major consumer of industrial raw materials, we now turn to examine the response of commodity prices to Chinese macroeconomic news. China alone accounts for approximately 60% of the global demand for aluminum, 55% of copper, and 15% of oil, among other commodities.[6] Hence, we expect significant price responses to Chinese macro surprises for these commodities where Chinese demand is most dominant, particularly industrial metals. To capture these heterogeneous effects without relying on more aggregate commodity indices, we study Bloomberg's disaggregated commodity sub-indices for copper, aluminum, oil (both WTI and Brent), and agriculture. All these indices are constructed using spot and futures market data.

Focusing solely on IP surprises, we estimate equation (2) using (log) price changes for commodity prices as the dependent variable. In this case, and always aiming to capture the response at the highest possible frequency, we follow a mixed strategy where we construct the price reaction using either intraday or closed-to-open data when possible. In particular, the specific timing of each macro announcement determines the identification strategy in this case. For early-morning releases, commodity prices are compared from the previous day's close to 30 minutes post-announcement, while for later releases, we rely on our one-hour window, following the same approach as for Asian equities and yields. Therefore, we tailored our identification strategy for each specific release, which responds to the fact that morning releases in China occurred while different commodity markets (in particular, US-based contracts) are still closed. Appendix D.2 further discusses and explains how we adjust our identification strategy for early morning releases relative to the others. Table 5 shows the response of each commodity price index after an IP surprise.

[6]Table A.1 in the Appendix reports detailed figures on China's global commodity demand shares.

Table 5: High-Frequency Effect of Chinese IP Surprises on Commodity Prices

	Copper	Aluminium	WTI Oil	Brent	Agriculture
IP Surprise	0.22***	0.07**	0.21***	0.16**	0.03
	(0.08)	(0.03)	(0.07)	(0.06)	(0.03)
Observations	74	75	73	73	75
R^2	0.28	0.05	0.22	0.19	0.03

Note: This table reports the estimated effects of Chinese industrial production surprises on commodity price changes. Each column represents a separate regression using Bloomberg sub-indices. For WTI and Brent, regressions include year fixed effects. Robust standard errors are reported in parentheses. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

A 1 percentage point positive IP surprise in China brings an increase of 0.22% and 0.07% in copper and aluminum prices, respectively. The effects are sizable and accord with the previous evidence of China being one of the countries that drives the worldwide demand for these two commodities. Similarly, the response of Oil prices is 0.21% and 0.16% for WTI and Brent Oil prices, respectively. For Oil regressions, we add years fixed effects to further control for the abrupt movements that this price experienced, particularly during the Covid pandemic and 2021-2022 due to the rise in global geopolitical risks.[7] Appendix D.2 shows the time series of the Oil price change, used as the dependent variable for these regressions. Notably, the higher volatility in Oil price changes is concentrated after 2020, consistent with the aforementioned episodes. Moreover, and for completeness, Table A.11 in Appendix E.4 reports the effect on commodity prices when we add year fixed effects to all specifications. In this case, all our results hold.

We further study whether other types of news can have different effects on the prices of other commodities. Appendix E.4 shows the high-frequency response of the same commodity indices but using the export surprise instead. A 1 percentage point surprise in Exports brings a significant increase in the price of Copper, WTI and Brent Oil of 0.02%, 0.03% and 0.03%,

[7]Oil prices dropped significantly during the COVID pandemic in 2020, followed by a sharp and persistent increase during 2021 and 2022, partly explained by increasing geopolitical tensions. In fact, by proposing a new index for geopolitical fragmentation, Fernández-Villaverde et al. (2024) show that such an index attains its higher values after 2022 with the unraveling of the Russia-Ukraine and the Hamas-Israel conflicts. Thus, oil may respond differently depending on the year, something that we account for including year fixed effects.

respectively. Oil prices are known to be closely tied to global economic activity (Kilian, 2009). Thus, new information that China is producing or exporting more than anticipated can signal stronger global demand, prompting an upward revision in growth expectations and, in turn, pushing oil prices higher. Existing evidence shows that oil prices respond immediately to news about future supply, highlighting the relevance of the expectations channel in this market, (Känzig, 2021). In line with this, we interpret the oil price response to both Chinese industrial production and export surprises as reflecting improved expectations for future oil demand.[8]

4 Close-to-Open Effects

Building on the previous evidence, we turn to study the potential effects of Chinese surprises on international stock returns. Most stock markets, apart from the Asia-Pacific economies, are closed when China publishes its macro indicators due to time zone differences.[9] Figure A.11 included in Appendix D.4 shows the timing of such trading differences. Hence, there is no intraday information available for stock returns.

4.1 Empirical Specification

However, by relying on the different time zones, we propose a slightly different identification strategy for this case. In particular, we adjust our previous specification:

$$\Delta y_{i,t}^{oc} = \alpha_i + \gamma s_{CHI_\tau}^{Y} + \beta X_\tau + \varepsilon_{i,t} \tag{3}$$

Where $\Delta y_{i,t}^{oc} = y_{i,t}^{open} - y_{i,t-1}^{close}$ is the difference between the opening value of index $y_{i,t}$

[8]With respect to other surprises, in Appendix E.4 we also show that positive news about GDP news does not affect the prices of commodities, except for Agriculture. This again can be framed with China being one of the largest importers of agricultural products in the world, such as soybeans, grains, wheat, and fruits, to name a few.

[9]As discussed (Table 1), China publishes most of its macro indicators (in particular industrial production) during their morning and on average around ten. At this moment, the European, the US, and Latin American stock markets are closed.

from country i at day t relative to its closing value the day before $t-1$. From the perspective of Non-Asian economies, we compute $\Delta y_{i,t}^{oc}$ for each day where China publishes any macro variable overnight. We argue that this additional piece of news was not part of the information set of agents abroad at the time their local stock markets closed. Therefore, we interpret $y_{i,t}^{open}$ on the day after a Chinese surprise $s_{CHI_t}^{Y}$, as incorporating the additional and unanticipated piece of information that appeared during the night. X_t denotes other surprises release within the same time window. The estimation of the effects rely on the same two assumptions of the previous high-frequency analysis: that there are no systematic events happening within the same time window and that Chinese surprises capture the unexpected component of the release. The analysis in Section 2.3 supports the first assumption.

4.2 International Stock Returns

Based on specification (3), we define the dependent variable $\Delta y_{i,t}$ as the (log) difference close-to-open MSCI stock return index measured in USD for each country i on day t. In all the estimations below, we focus exclusively on days with macroeconomic announcements in China since these are the relevant days for estimating the effects.[10] We collect the close-to-open MSCI indices for 28 countries and for all days when China (in-between days) announces its macroeconomic figures. The specific list of countries is presented in Table A.7 in Appendix C.3.

Table 6 shows the impact of all Chinese Surprises on stock returns relying on the close-to-open specification. In line with previous results, IP emerges as the most important surprise series driving stock price reaction abroad. A 1 percentage point positive surprise in industrial production induces a significant rise in stock market returns of approximately 10 basis points. Markets react to higher-than-expected industrial activity in China and interpret it as a signal of improving global growth prospects, leading to higher stock returns. On the contrary, and

[10]The focus only on the days of events is common in the literature analyzing the financial effects of monetary policy and macroeconomic surprises. Including all the days in our sample would increase standard errors without affecting the estimated coefficients significantly.

also consistent with the intraday evidence, GDP, retail sales, CPI, and imports do not exhibit statistically significant effects. Exports exhibit only a mildly significant effect. Hence, it is not that any class of news in China brings significant effects on stock markets abroad, but one that reflects economic activity. This result is consistent with the findings of Corneli et al. (2023) for China surprises during the COVID period.

Table 6: Effect of Chinese Macro Surprises on Global Stock Returns (Close-to-Open)

	Ind Prod	Retail Sales	Exports	Imports	PPI	CPI	GDP
Coefficient	9.60***	1.10	0.56*	0.12	-19.12	21.33	17.22
	(2.59)	(4.84)	(0.31)	(0.41)	(11.78)	(13.97)	(27.29)
Observations	4,027	3,288	3,741	3,750	3,530	3,530	1,467
R^2	0.09	0.06	0.04	0.04	0.02	0.02	0.13

Note: This table reports the estimated effects of Chinese macroeconomic surprises on international stock returns using an interday close-to-open window. When two macroeconomic indicators are released on the same day (Retail Sales & Industrial Production (Ind Prod), Exports & Imports), the specification includes both series of surprises. Robust standard errors are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

To further validate our identification strategy, we propose a Placebo test where we re-estimate equation (2) using leads and lags of Chinese IP surprises. If the effect truly reflects a causal relationship, and if there is no anticipation from the markets, we expect a significant response only during announcement days. In Appendix F.1 we report the results of the Placebo test. We confirm that stock returns react only on announcement days with no meaningful effects during the previous or subsequent days. Baum et al. (2015) argue that there could be concerns about potential leakage of macroeconomic data before the official releases. Giving our placebo test, we can also interpret the lack of a significant reaction during the previous day as suggestive evidence that leakage situations are less likely to be important.

4.3 Heterogeneous Effects of Chinese Macro Surprises

While the evidence suggests that IP surprises matter for stock returns, we turn to study whether such surprises affect differently depending on their sign or magnitude (see, for example, Gonçalves et al., 2021; Caravello and Martinez-Bruera, 2024; Gazzani et al., 2024). For doing so, we extend our specification in two ways. First, we interact the IP surprise series with two different dummies, each equal to one if the shock is either positive or negative. Second, we propose another different specification where we interact the surprise series with two dummies equal to one if the absolute value of the shock is higher (or lower) than 1.5 times its standard deviation. The specific equations of these two regressions and the detailed results are shown in Appendix F.6.

The results reveal a marked asymmetry in stock market responses depending on the sign of the Chinese IP surprise. A positive 1 percentage point surprise leads to a substantial increase of approximately 16.5 basis points in global stock returns, whereas a negative 1 percentage point surprise results in a much smaller decline of around 5 basis points. This suggests that good news from China generate a significantly stronger reaction than bad news, which can be interpreted as an optimistic bias or asymmetric sensitivity in international equity markets to such news.

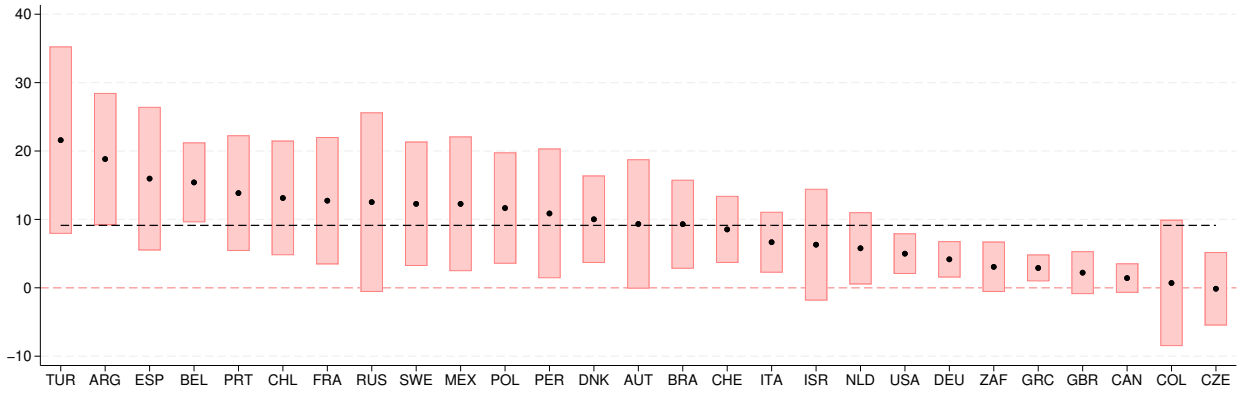
In contrast, when analyzing the size of the surprise, we find no significant difference between the impact of large and "moderated" surprises (below 1.5 standard deviations). Therefore, while the sign of the surprise clearly matters, its magnitude does not appear to amplify or attenuate the response in a meaningful way. This suggests that the stock market's reaction is driven more by whether the news is good or bad, rather than by how large the surprise is.

4.4 Comovement and Amplification of Asset Prices Response

As discussed, one of the main claimed features of the GFC is that it is characterized by "large common movements in asset prices, grows flows and leverage" (Rey, 2013). Moreover,

Miranda-Agrippino and Rey (2020) support the presence of co-movements in gross inflows across countries that are not aligned with countries' specific domestic conditions, while instead, they seem to arise from "center economies". Given the importance of China for the global economy, we test whether the occurrence of Chinese surprises supports some degree of synchronization of stock return responses across countries. We estimate equation (3) allowing γ to differ across counties (γ_i). Figure 1 shows the close-to-open response of stock returns to an IP surprise shock in China estimated *for each* of the 27 countries of our sample. Besides the point estimate, we add the confidence interval for each country and the average effect, which is denoted by a vertical dashed line. We order the countries starting from the largest response up to the one with the lowest marginal effect.

Figure 1: Impact of Industrial Production Surprises on Individual Stock Returns



Note: The figure presents the estimated response of stock returns in each country to industrial production surprises in China. Each point represents the estimated γ coefficient from equation (3), with 90% confidence intervals based on robust standard errors. The black dashed line represents the average of the betas, which coincides with the panel estimation value (9.78bp).

Positive IP surprises in China lead to a statistically significant increase in stock returns in 21 out of the 27 countries in our sample (approximately 78%) indicating a broadly coordinated response across global equity markets. Countries such as Turkey, Argentina, Spain, Belgium, Chile, and France exhibit particularly strong reactions. While this evidence supports a substantial comovement in global markets, rather than focusing on a discretionary set of countries, we adopt a more general approach to classify economies. Specifically, we

argue that the different responses could be linked to each country's economic exposure to China. That is, the magnitude of the reaction likely depends on how central China is to a country's trade, financial, and production networks.

To explore the potential sources of heterogeneity, we augment our dataset with eight country-specific characteristics for each economy. First, following the IMF's classification, we distinguish between Emerging and Advanced Economies. Second, we compute each country's export and import dependence on China, measured as the share of exports (imports) to (from) China relative to total exports (imports). These indicators are further complemented by the country's GDP per capita and overall trade exposure: the shares of exports and imports relative to GDP, as well as its "trade openness", defined as the sum of exports and imports over GDP. Finally, we incorporate a measure of financial openness, calculated as the sum of external assets and liabilities over GDP. Given the span of our sample, we compute all indicators as averages over the 2006–2023 period.[11] To shed light on how these characteristics shape the strength and direction of the stock market response, we extend the close-to-open specification (3) to explicitly account for these variables as follows:

$$\Delta y_{i,t}^{oc} = \alpha_i + \gamma s_{CHI,\tau}^{IP} + \theta(s_{CHI,\tau}^{IP} \times Z_i) + \beta X_\tau + \varepsilon_{i,t} \tag{4}$$

The variable Z_i, represents each of the eight country-specific indicators, which we incorporate individually into equation (4) to assess their role in shaping the response to China's IP surprises. In the first specification, Z_i, is a binary variable equal to one if country i is classified as an Emerging Market Economy (EME), and zero otherwise. For all remaining specifications, Z_i is a continuous variable capturing the specific value of the corresponding indicator for each country. The estimated coefficients from these regressions, each based on a separate interaction with China's IP surprises, are presented in Table 7.

Starting with the first specification, we find that stock returns in EMEs increase by

[11] The specific values of the export and import shares used in our estimation for each country are reported in Table A.7 included in Appendix C.3.

Table 7: Effect of Chinese IP Surprises on Close-to-Open Returns Conditional on Country Characteristics

	EME	CN X-Dep	CN M-Dep	X/GDP	M/GDP	Trade Open	Fin. Open	GDP pc
IP Surprise (γ)	6.33***	6.93***	6.85***	9.42***	10.54***	10.09***	9.39***	9.80***
	(1.89)	(2.04)	(2.35)	(2.63)	(3.11)	(2.89)	(2.50)	(2.86)
Interaction (θ)	4.02**	0.14***	0.09	-0.05	-0.09	-0.04	-0.00**	-0.00*
	(1.70)	(0.03)	(0.14)	(0.03)	(0.06)	(0.02)	(0.00)	(0.00)
Observations	5,157	5,157	5,157	5,157	5,157	5,157	5,157	5,157
R^2	0.069	0.068	0.068	0.068	0.068	0.068	0.068	0.068

Note: This table shows the effect of Chinese industrial production (IP) surprises on equity returns, measured as the return difference between the first hour after market open and the last hour before close. Each column includes an interaction between IP surprises and a country-level characteristic. EME = Emerging market classification (IMF WEO Oct. 2024). CN X-Dep / CN M-Dep = Share of exports/imports to/from China. X/GDP, M/GDP = Exports/imports as % of GDP. Trade open = (Exports + Imports)/GDP. Fin. open = External assets + liabilities over GDP. GDP pc = GDP per capita in USD millions. All variables (except EME) are country averages over 2006–2023. Sources: IMF DOT and WEO Oct. 2024. Standard errors clustered by country and date. Robust standard errors reported in parentheses. *** p <0.01, ** p <0.05, * p <0.1.

approximately 10 basis points in response to positive Chinese IP surprises. The response is on average 4 basis points larger than that observed for Advanced Economies. This highlights a greater sensitivity of emerging markets to economic improvements in China. Moreover, a 1 percentage point higher export dependence on China is associated with a significant rise of about 0.14 basis points in stock returns, whereas import dependence does not exhibit any meaningful direct effect. The remaining variables, including overall trade openness, financial openness, and GDP per capita, either show no statistically significant impact or, when they do (as in the case of financial openness and income), their magnitudes are negligible. The stronger response across EME's markets can be framed within these last results. There is a strong and positive correlation between EMEs and export dependence on China. However, as expected, the correlation between EMEs and trade, financial openness, and GDP per capita is negative in our sample. For completeness, the specific values of these correlations are shown in Appendix F.4.

Taken together, the results point to two main effects of positive Chinese IP surprises on

global stock prices. First, such surprises generate a statistically significant, positive, and broadly coordinated response across the vast majority of countries in our sample. Such a common reaction is particularly relevant given the considerable heterogeneity among these countries in terms of development level, financial integration, income per capita, and trade exposure, to name a few. Second, the magnitude of the stock market response is amplified by the intensity of each country's bilateral export relationship with China, rather than by its overall exposure to global trade. In other words, it is the specific trade linkage with China, and not overall trade openness, that leads to a stronger reaction across countries. These two findings seem to suggest that equity markets are responding primarily to China-specific economic news, rather than to a broader improvement in global economic conditions. In light of this concern, in Section 5.3 we provide further evidence that our results are consistent with a China-specific effect on international prices, rather than a response to improved global growth.

4.5 The VIX Index

Before closing the close-to-open evidence, we analyze the response of the VIX index. This index is widely used as a measure of market uncertainty and risk aversion, and it is constructed using the prices of the S&P 500 options expiring in the next 30 days. Hence, it reflects market expectations of future volatility. As discussed by Rey (2013), the VIX features a strong co-movement with global financial conditions. Hence, evidence that this index declines after positive macroeconomic news from China would shed light on whether these announcements matter in reducing global uncertainty.

While in this case we apply the same close-to-open strategy as before, the time length is shorter compared to the time window used in the stock price reaction. As the VIX is derived from options of the S&P 500 (and not from trading itself), it depends on the liquidity of the option market rather than actual stock transactions. Thus, the index starts being calculated

at 3 am (ET), using available information from S&P 500 options and available futures.[12] This is roughly five hours after China publishes its macroeconomic indicators. With the intention of using the tightest time window after the surprises, we use the 3 am opening value and compare it to the closing value of the index the day before to compute Δy_t^{co} and estimate equation (3). As before, Appendix D.3 describes the specific timing of the index to build our close-to-open strategy.

Given the relevance of the VIX as a proxy for the GFC, we prefer to show the effects using all the Chinese surprises. Table 8 displays the estimated effects. Consistent with all the aforementioned evidence, the results show a significant decline in implied volatility after positive IP surprises. A positive 1 percentage point IP surprise in China reduces the index by approximately 44 basis points upon impact. The remaining surprise series do not affect the VIX in a meaningful way. The results consistently support that IP surprises in China can have global consequences through their implications on the GFC.

Table 8: Effect of Chinese Macro Surprises on the VIX - Close-to-Open

	Ind. Prod.	Retail Sales	Exports	Imports	CPI	PPI	GDP
Coefficient	-0.44***	-0.41	-0.03	-0.08*	0.33	0.90	-0.95
	(0.17)	(0.45)	(0.04)	(0.04)	(1.12)	(1.37)	(2.56)
Observations	180	180	179	180	180	180	180
R^2	0.02	0.02	0.03	0.03	0.00	0.00	0.00

Note: This table reports the estimated effects of Chinese macroeconomic surprises on daily VIX open-close differences, using data from 2006 to 2024. The open window of the VIX is at 3am (ET), some hours after the information release. Robust standard errors are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

As in the case of stock returns, the response of the close-to-open of the VIX is not significant on any day except for the actual day of the release. This is shown in Appendix F.1 where we repeat our Placebo specification using up to four leads or lags of the surprise

[12]In fact, the most liquid period for the S&P 500 options, before the US stock markets open, is typically between 3 and 9:15 am (ET). At 3 am (ET), overnight market transactions, especially from European Markets, provide enough data for meaningful updates of this volatility measure.

series. Consistently, there is no VIX reaction to Chinese IP surprises on any other day, except during days where IP figures are published.

5 Understanding the Effects

According to our evidence, Chinese IP surprises induce a synchronized increase in stock returns worldwide, a decrease in the VIX, and an increase in long-term yields both in China and in other economies. We now focus on understanding and interpreting the link between these responses, exploring the origin of the macro surprises, and studying the implications of these surprises as a driver of the Global Financial Cycle.

5.1 Risk Premium Channel

The observed comovement between 10-year yields and stock returns offers valuable insight into how investors perceive and interpret Chinese macroeconomic surprises. In a standard asset pricing framework, the price P_t of a risky asset, such as equities, can be expressed as:

$$P_t = \sum_{j=1}^{\infty} \frac{\mathbb{E}_t[CF_{t+j}]}{(1 + r_{t+j})^j},$$

where $\mathbb{E}_t[CF_{t+j}]$ denotes the expected future cash flows (e.g., dividends or coupon payments) and r_{t+j} is the discount rate, which includes both the risk-free rate and a risk premium component. For bonds, the long-term yield y_t^{long} can be decomposed as:

$$y_t^{\text{long}} = \frac{1}{\tau} \sum_{j=1}^{\tau} \mathbb{E}_t[r_{t+j}] + \text{TP}_t, \tag{5}$$

where τ is the maturity horizon, $\mathbb{E}_t[r_{t+j}]$ is the risk-neutral expectation of future short rates, and TP_t is the term premium reflecting risk compensation.

A positive Chinese IP surprise leads to a rise in equity prices in China, without a significant reaction in short-term domestic yields. This suggests that Chinese monetary

policy is not the primary transmission channel of the surprise. However, the same surprise induces a significant increase in long-term (10-year) Chinese bond yields, which, according to equation (5), reflects an increase in the term premium. Similarly, we observe a rise in 10-year US Treasury yields, while short-term US yields remain unchanged. This pattern, also observed in other economies (such as Germany or the UK), points to a broader upward shift in term premia.

The simultaneous increase in global stock returns and long-term yields, without movement in short rates, is consistent with the presence of a *Risk Premium Channel*, as described by Cieslak and Schrimpf (2019), and with the *Hedging Premium* mechanism proposed by Cieslak and Pang (2021). Therefore, in this context, a positive Chinese IP surprise leads investors to increase their appetite for risk and hedge less.

The fact that the VIX index also significantly drops only after IP announcements is also consistent with a higher willingness for risk-taking behavior from international investors. Taken together, we can argue that the *Risk Premium Channel* is indeed playing a relevant role in understanding the effects of Chinese surprises.

5.2 Improved Growth Prospectives

While we argue that the *Risk Premium* channel plays a key role in explaining the effects of Chinese macro surprises, our broader set of evidence also points to the presence of a *Growth Expectations* channel operating.

In principle, the lack of a high-frequency comovement between short-term yields and stock returns might suggest that *Growth Expectations* are not the dominant transmission mechanism. The muted response of local short-term interest rates can be partly attributed to China's monetary policy framework, which does not follow an Inflation Targeting regime but considers output growth as its objective (see, for example, Chen et al., 2023).

However, this interpretation is incomplete without considering the behavior of commodity prices. As shown in Table 5, positive Chinese IP surprises lead to significant increases in

the prices of copper, aluminum, and Oil (key intermediate inputs in industrial production) while the agricultural commodity index shows no significant response. The specific reaction of input-intensive commodities suggests that investors interpret the surprise as signaling of stronger growth prospects in China, which in turn leads them to revise upward their expectations for future global production and demand. This interpretation is further supported by the fact that countries whose exports are highly dependent on China, independently of their absolute degree of openness, have a stronger stock price response relative to the others.

Providing further suggestive evidence for the presence of a *Growth Expectations* channel is challenging, particularly given the increasing interconnectedness of the global economy. Ideally, one would need to demonstrate that the international financial response is driven specifically by better economic conditions in China, rather than by generalized improvements in global growth conditions that affect China. Building on the increasingly dominant role of China as a driver of global production, it is reasonable to expect that the market impact of its macroeconomic news has also grown over time. In the next two sections, we provide suggestive evidence supporting both interpretations.

5.3 Chinese Specific or Global Shocks?

While we claim that our macro surprises are a reflection of idiosyncratic Chinese-specific conditions that affect financial conditions abroad, we acknowledge that such responses can also be driven by global shocks hitting the economies. In other words, the surprises may reflect that markets are either learning about the state of the Chinese economy or about the global business cycles. Such international considerations are relevant, not only because China is one of the largest exporters worldwide, but also since many international companies produce in China.

Assessing the relative importance of the Chinese to the global components is not straightforward. Boehm and Kroner (2025) study the responses of the US stock market

but using macro surprises computed for other G7 countries. They argue that no other surprises, except for the US, bring a significant reaction in stock returns. An attempt to replicate the same analysis in our framework is challenging and potentially less informative since China has more capital controls.[13] Therefore, we decided to assess the content of the surprises using an alternative analysis.

First, we exploit the fact that Chinese industrial production (IP) announcements occasionally coincide with macroeconomic releases from other major economies, in particular Japan and the UK. This is detailed in Appendix B.2. If the observed effects were driven by global news rather than China-specific information, we would expect that the surprises from these countries to be significantly correlated with their Chinese counterparts. However, such correlation is equal to 0 and 0.15 for Japan and the UK, respectively. Table A.5 included in Appendix B.2 shows the correlation for all the economies in our sample.

Second, and to further strengthen the previous point, we re-estimate equation (3), controlling for all specific macro announcements from Japan and the UK that occur on the same day as China's IP release. We present this additional exercise and discuss its specific results in Appendix F.5. We show that once these controls are included, only the Chinese IP surprise remains statistically significant. In other words, if the effects were driven by broader global factors, we would expect the other surprises to also influence stock returns, which they do not.

Third, we can better understand the effects of the macro surprises by looking at the characteristics of the responding economies. This was introduced in Table 7. As discussed, while Chinese export dependence significantly amplifies the stock response, the same is not true for Chinese import dependence. Moreover, the degree of overall Trade or Financial Openness does not amplify the response either. Hence, through the lens of

[13]In fact, China has a capital control index of 0.9 for capital inflows in 2019 according to the measure computed by Fernández et al. (2016). This index captures the differential treatment of residents and non-residents based on administrative and market-based data. The index is computed as an average from different asset categories, taking values between 0 (low capital controls) and 1 (high capital controls). As a comparison, the same index for the US in 2019 was 0.1.

our results, we argue that the country-specific characteristics that increase the response are particularly linked to export-dependence with China rather than with global dependence or interconnectedness.

Time-Varying Impact of Chinese Macro Surprises

As discussed in Appendix A, China has gone through a remarkable economic transformation in recent years, expanding its production capacity, trade volume, and demand for raw materials. As shown in Figure A.1, China accounted for approximately 7% of global GDP (in PPP terms) in 2006, the starting point of our dataset. Fueled by an average annual GDP growth of roughly 7%, China's share of world output steadily increased over the following decade, surpassing the United States in 2016 to become the world's largest economy. Given this upward trajectory, we conjecture that the global financial market response to Chinese industrial production (IP) surprises should reflect China's rising economic relevance. In other words, while other major economies could have cycled through periods of positive, modest or even negative growth during this period, we know that China maintained a consistent expansion, indicating that the relevance of its macroeconomic news likely increased over time.

To assess whether the effect of surprise indeed varied over time, we extend our cross-country panel close-to-open specification and estimate:

$$\Delta y^{oc}_{i,t} = \alpha_i + \gamma s^{IP}_{CHI,\tau} + \phi[s^{IP}_{CHI,\tau} \times \mathbb{1}(\text{Year} > 2016)] + \beta X_\tau + \varepsilon_{i,t} \tag{6}$$

Where $\mathbb{1}(\text{Year} > 2016)$ is a dummy variable equal to one after 2016, the year China overtook the US as the largest global economy. In this case, we focus on IP surprises only. The results of this estimation, reported in Appendix F.7, show that both coefficients, γ and ϕ, are highly significant and equal to 7 and 4.5, respectively. Therefore, while Chinese IP surprises brought a positive effect on international stock prices of approximately 7 basis

points on average, such impact was approximately 4.5 basis points higher after 2016.

This amplification supports our narrative of China's increasing influence in the global economy. It is particularly striking when contrasted with the stability of global GDP growth, which remained flat at approximately 2.8% over the same period according to World Bank estimates. Taken together, we interpret this result as an additional supporting sign that the observed financial responses are increasingly driven by the Chinese economy rather than by global macro conditions.

5.4 The Effects on the Global Financial Cycle

Finally, circling back to the original motivation, we study whether Chinese macro surprises influence the Global Financial Cycle. This builds on the close-to-open evidence for the VIX, given its comovement with the GFC. However, the effects of our Chinese macro surprises may be only transitory, not affecting asset prices persistently at lower frequencies. We complement the daily analysis by examining the monthly effects of shocks on the GFC series computed by Miranda-Agrippino et al. (2020). The GFC series, originally labelled as MAR, is computed using a Dynamic Factor Model for a panel of asset prices traded around the world. The identified common factor explains more than 20% of asset price fluctuations, and reflects fluctuations in global risk appetite (see, for example, Rey, 2013). Therefore, a rise in the series indicates increased risk-taking behavior, while a decline signals heightened risk aversion and tighter financial conditions. Since our IP surprise series is observed only once per month, aggregation to the monthly frequency is straightforward. We estimate its effect on the Global Financial Cycle proxy using a Local Projection specification.

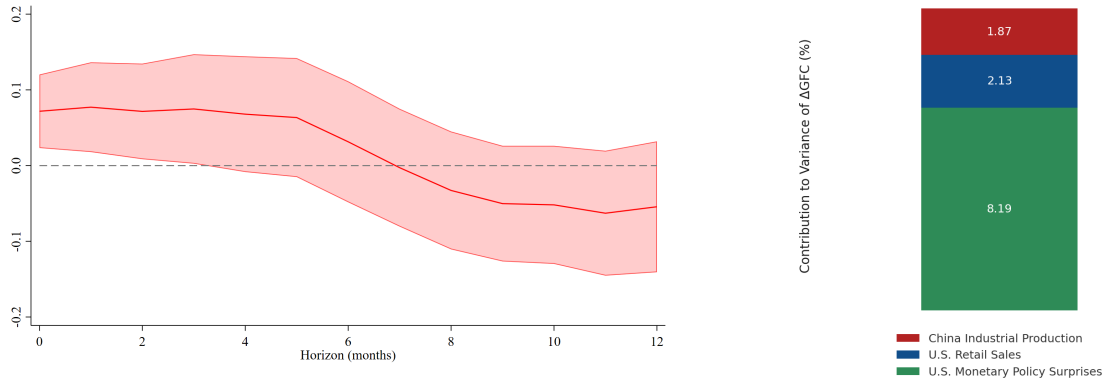
$$\ln y_{t+h} - \ln y_{t-1} = \alpha_0^h + \alpha_1^h s_{CHI,t}^{IP} + \alpha_2^h X_{t-1} + \epsilon_{t+h} \tag{7}$$

Where y_{t+h} denotes the value of the MAR index at time $t+h$. We are interested in the parameter α_1^h, which we interpret as the dynamic response of the MAR index to a Chinese

news shock at horizon h. We complement this specification with relevant controls, including lags of the dependent variable, the Dollar Index, broad commodity price indices, and the VIX. Panel (a) of Figure 2 displays the estimated effects.

Figure 2: Dynamic Effects on MAR index to a Chinese IP surprises

(a) Response of the GFC (b) Variance Decomposition of GFC



Note: Panel (a) shows the impulse response of the global financial cycle (GFC) to a one-standard-deviation surprise in China's industrial production. Panel (b) displays the contribution of each shock to the variance of monthly changes in the GFC. Shaded red areas in Panel A denote 90% confidence intervals based on Newey-West standard errors. The horizontal axis in Panel (a) indicates months after the surprise.

As shown in the previous Figure, an IP surprise in China triggers an immediate, positive, and statistically significant response in the MAR index. This effect persists for approximately three months before becoming insignificant. The response is persistent, and its positive effect aligns with the mentioned "Hedging Premium" channel, suggesting that Chinese macro news has durable effects on global risk sentiment.

To stress the contribution of Chinese news to the GFC, we estimate the dynamic response in (7) while controlling for other major shocks known to influence global financial conditions. Specifically, we assess whether Chinese IP surprises remain relevant even after accounting for US monetary policy and macroeconomic news—two factors extensively documented as key GFC drivers (see Miranda-Agrippino and Rey, 2020; Boehm and Kroner, 2025). For monetary policy, we use the shock series computed by Nakamura and Steinsson (2018). For US macroeconomic news, we construct retail sales surprise measures following the

methodology in Boehm and Kroner (2025), using Bloomberg data.[14] While US IP surprises might seem like a natural benchmark, we focus on retail sales for two main reasons. First, although Boehm and Kroner (2025) analyze the impact of various US macro releases on international stock markets, IP is not central to their analysis. Second, retail sales map closely to IP and exhibit a similar quantitative impact on stock prices as our Chinese surprises.[15]

Through equation (7), we perform a variance decomposition at $h = 0$ to compare the relative importance of each shock. As shown in Panel (b) of Figure 2, US monetary policy shocks explain the largest share of the variance in the MAR index, accounting for 8.2%. This is followed by US retail sales surprises at 2.1% and Chinese IP surprises at 1.9%. We interpret the contribution of US macro news as a lower bound for its total importance, as we include only one (but still the most relevant) type of macro announcement. While for China only IP surprises induce significant effects on global asset markets, we conjecture that incorporating additional US news variables could further increase its share, possibly bringing it closer to that of US monetary policy shocks.

Despite being relatively smaller, the effect of Chinese IP surprises is far from negligible. These results reinforce our earlier high-frequency and open–close return findings, highlighting Chinese IP surprises as a meaningful contributor to the Global Financial Cycle.

6 Conclusions

We study the importance of Chinese macroeconomic surprises in driving worldwide financial market responses. Using forecast errors around the release of key macro indicators, we construct a new series of Chinese macro surprises. Relying on a one-hour time window around each release, we show that positive surprises in industrial production (IP) lead to an

[14] We replicate the series based on the methodology in Boehm and Kroner (2025), as the original data are not publicly available.

[15] For completeness, see Table 3 in Boehm and Kroner (2025). Although the authors report results for capacity utilization — a ratio involving IP — we prefer to focus on Retail Sales to preserve interpretability and alignment with our Chinese IP surprise series.

immediate increase in stock returns in China and across the Asia-Pacific region, a significant rise in long-term sovereign yields, and a positive response in the prices of commodities highly demanded by China.

We complement this evidence with a novel identification strategy that exploits the timing of Chinese news releases relative to global trading hours. Through this approach, we confirm that IP surprises generate positive spillovers in international equity markets. The magnitude of the effect is heterogeneous across countries and aligns closely with their trade exposure to China. The effects on stock returns, sovereign yields, and commodity prices are consistent with the Hedging Premium and Growth Expectations as transmission channels. Moreover, connecting with existing evidence of the GFC, we argue that Chinese IP surprises also bring a non-negligible effect on the VIX index, a widely used measure of global risk aversion.

Our findings offer new empirical evidence that macroeconomic surprises from large economies, such as China, can propagate globally through financial markets. This highlights an additional international transmission channel by which non-U.S. shocks influence asset prices worldwide. These results are particularly relevant for policymakers, as they highlight the importance of monitoring Chinese data releases, especially industrial production, in real time to better interpret current and expected market movements. More broadly, this paper contributes to a deeper understanding of the forces behind the Global Financial Cycle and its global implications.

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Chinese Macroeconomic Surprises and the Global Financial Cycle

Camila Gutierrez, Javier Turen and Alejandro Vicondoa

Online Appendix

A Data Appendix

A China in the Global Economic

This Section synthesizes some of the key stylized facts that frame China's evolving role in the global economic and financial landscape. Over the past four decades, China has gone through a remarkable transformation, emerging as a dominant force in global production, trade, and commodity demand.

Economic Size. Figure A.1 shows China's share of global GDP (at purchasing power parity), which evolved from 4.5% in 1980 to 18.6% in 2023, overtaking the United States (15.5%) in 2016. Such an impressive rise evidences China's ascent as a key player in the global economy, reshaping the dynamics of international growth and investment.

Trade Dominance. Figures A.2a and A.2b highlight China's central role in global trade. Its share of world exports climbed from near zero in 1980 to 14.3% in 2023, nearly matching the United States (14.8%). On the import side, China accounts for 11.7% of global imports, after the US with a share of 16.5%. This dual role as both a top exporter and major importer further supports China's large influence on global supply chains and trade patterns.

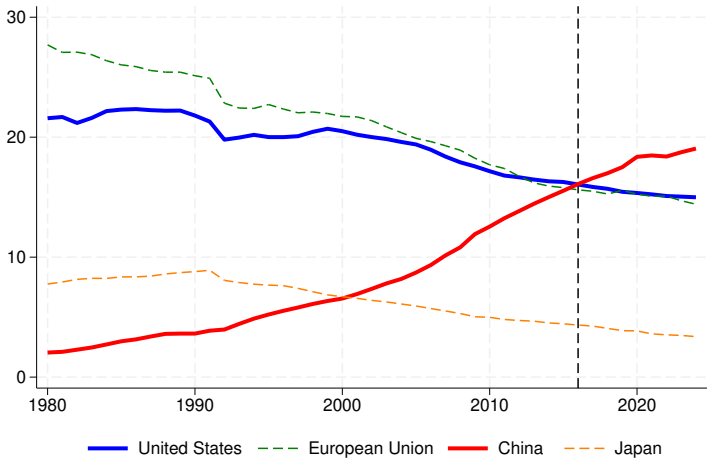
Commodity Leverage. Table A.1 highlights China's large weight in global commodity markets. China accounts for approximately 60% of global aluminum demand, 55% of copper, 50% of coal, and nearly 60% of iron ore. Moreover, even in sectors where it is not the dominant consumer, such as steel (40–55%) and oil (14–15%), China's demand significantly shapes global prices and production decisions. The empirical evidence shown in Section 3.4 provides direct evidence that further supports China's huge role in worlwide commodity markets.

Table A.1: China's Share of Global Commodity Demand

Aluminum	Copper	Oil	Gas	Coal	Steel	Iron Ore
60%	55%	14–15%	8–10%	50%	40–55%	58%

Note: Source: JP Morgan, October 2022.

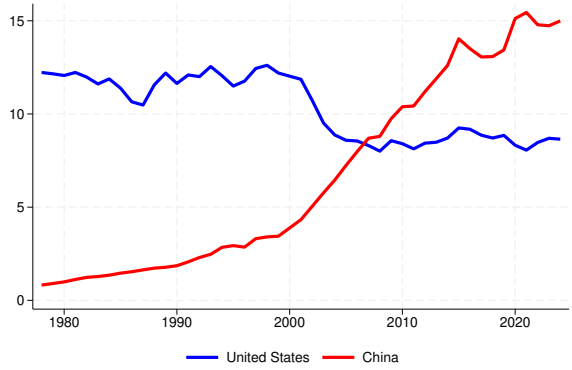
Figure A.1: Major Economies as Share of World GDP (PPP-Based)



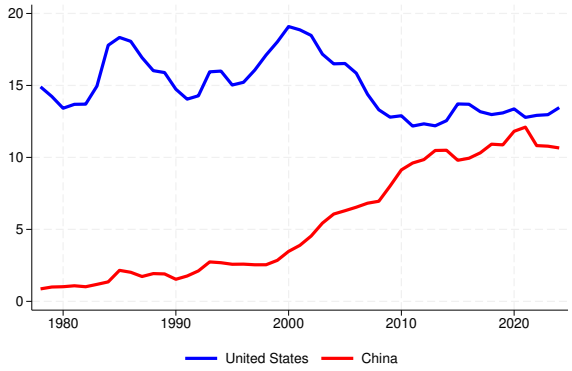
Note: Source: IMF World Economic Outlook, October 2024 dataset. The vertical line marks the year 2016, when China's share equaled that of the United States.

Figure A.2: China and the United States in International Trade

(a) Share of World Exports



(b) Share of World Imports



Note: Source: IMF Direction of Trade Statistics (DOTS).

B Chinese Macroeconomic Surprises

This section documents the construction, properties, and robustness of the Chinese macroeconomic surprise series used in our analysis. We focus on a set of key macro indicators classified by Bloomberg as "Highly Relevant," which includes industrial production, retail sales, GDP, consumer prices (CPI), producer prices (PPI), exports, and imports. These surprises are calculated as the difference between the realized values and Bloomberg's median (or mean, in robustness checks) forecast, capturing unexpected information released to the market.

Existing evidence has warned about how the GDP in this country has been measured over the last few years. Although our shock series for GDP resembles a white noise process, towards the end of the sample, the occurrence of positive surprises seems higher, which can be interpreted as a reflection of potential measuring issues. However, our analysis on the effects of Chinese macro surprises does not rely on this variable.

B.1 Median vs. Mean-Based Surprises and Weekend Releases

As a robustness check, we compare the macro surprises computed using the median of Bloomberg forecasts against those constructed using the mean of forecasts. Table A.2 presents the summary statistics for both versions. We can safely argue that there are no major differences in both the mean and the standard deviation of the series when we rely on the median instead of the mean.

To illustrate the similarity in distribution, Figure A.6 provides an example comparing the median- and mean-based surprise series specifically for industrial production.

In addition, we show the distribution of macroeconomic releases in China scheduled during weekdays relative to weekends in our sample. Table A.3 shows this distribution conditioning on all the indicators.

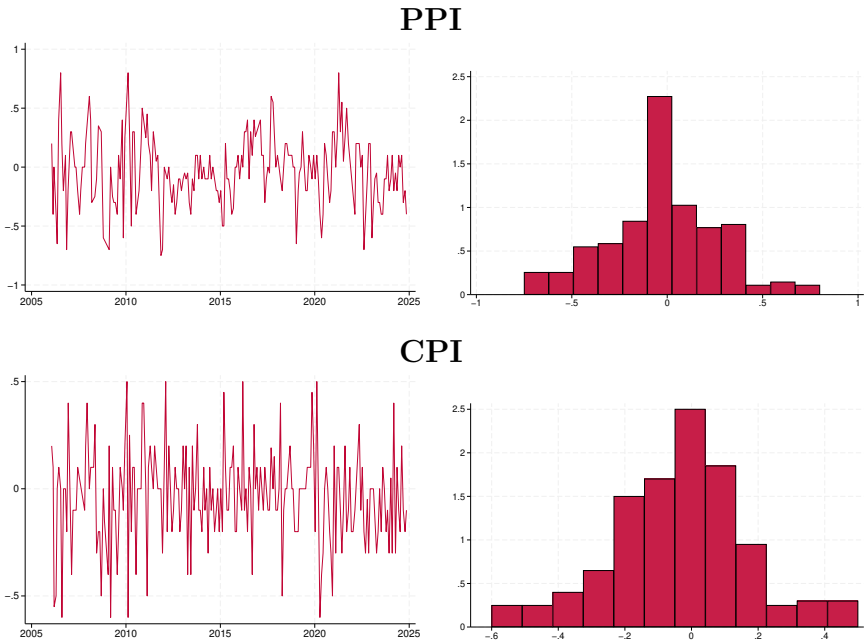
In general, in almost 90% of the time, our studied indicators are released during weekdays.

Figure A.3: Macroeconomic Surprises: Local Activity Indicators

Note: Time series of Chinese macroeconomic surprises (left column) and histograms (right column) by indicator.

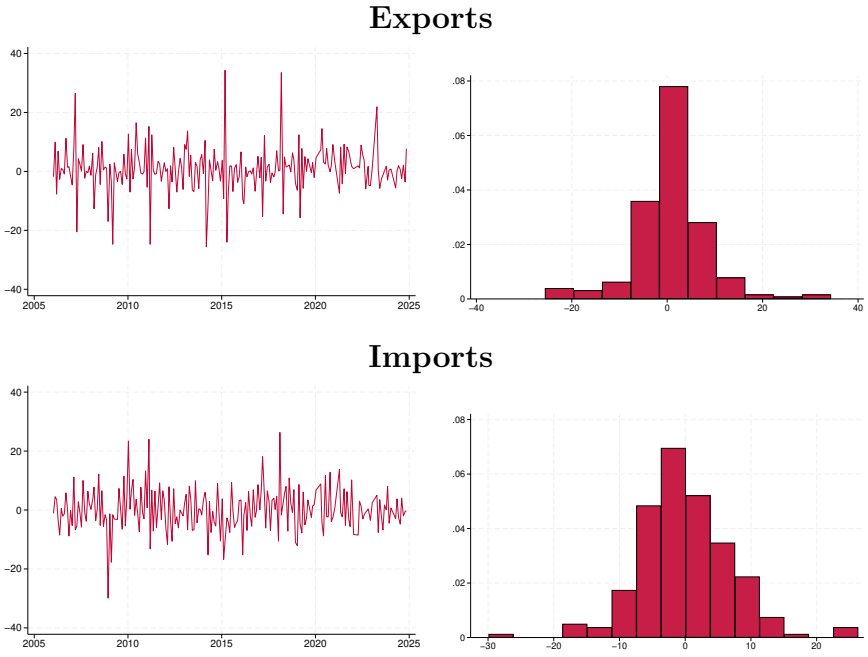
While price and trade indices are the categories that concentrate most of the weekend releases, the frequency is never above 15% of the time. On the contrary, activity-related indices such as Industrial production, retail sales, or GDP are hardly ever released during weekends. In this case, as worldwide stock markets are usually closed during weekends, we remove these non-weekday releases from the studied sample.

Figure A.4: Macroeconomic Surprises: Price Indicators



Note: Time series of Chinese macroeconomic surprises (left column) and histograms (right column) by indicator.

Figure A.5: Macroeconomic Surprises: Trade Indicators



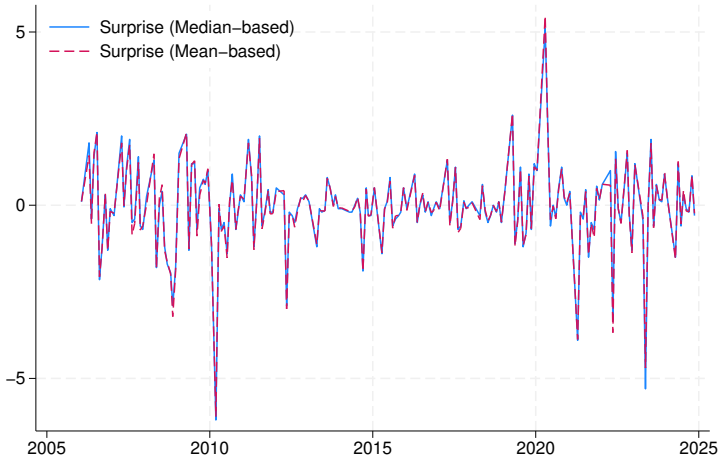
Note: Time series of Chinese macroeconomic surprises (left column) and histograms (right column) by indicator.

Table A.2: Summary Statistics: Median vs. Mean-Based Surprises

	Median-Based		**Mean-Based**	
	Mean	Std. Dev.	Mean	Std. Dev.
GDP	0.09	0.37	0.10	0.39
Industrial Production	–0.04	1.21	–0.06	1.20
Retail Sales	–0.08	1.51	–0.10	1.48
CPI	–0.03	0.27	–0.03	0.27
PPI	–0.03	0.42	–0.03	0.43
Exports	0.77	7.84	0.75	7.78
Imports	0.03	7.12	0.09	7.17

Note: The table reports the mean and standard deviation of macro surprises constructed using both the median and the mean of Bloomberg survey forecasts.

Figure A.6: Comparison of Industrial Production Surprises: Median vs. Mean-Based



Note: The figure compares the median- and mean-based surprise series for Chinese industrial production, showing their close alignment across the sample period.

B.2 Release of Information in Other Economies

In this Section, we study the frequency with which other countries release information about their economic indicators on the same day as China. Evidence of a systematic overlap between the appearance of such news could affect our estimations. To assess this hypothesis, we compute macro surprises for other economies using Bloomberg's Economic Calendars and follow the same baseline procedure as for China, as equation (1) in the main text. Afterwards, we compute the conditional probability of information releases from other

Table A.3: Distribution of Macroeconomic Surprises by Day of Release

Variable	**Weekdays**	**Weekends**	**Total**
CPI	199 (88%)	28 (12%)	227
PPI	199 (88%)	28 (12%)	227
Exports	182 (85%)	32 (15%)	214
Imports	183 (85%)	32 (15%)	215
GDP	76 (100%)	0 (0%)	76
Retail Sales	180 (94%)	12 (6%)	192
Ind. Prod.	179 (94%)	12 (6%)	191

Note: The table reports the distribution of macroeconomic surprises released on weekdays versus weekends. Given that financial markets are generally closed on weekends, the empirical analysis excludes weekend observations and only considers surprises announced on weekdays.

economies during the same day, conditioning on the closed-to-open window during which China releases information. In our framework, when we refer to the closed-to-open window, we account for the probability that when China announces any variable, the stock market in the other economy is actually *open*.

To construct our comparison, we consider all the releases of (highly relevant) economic information from China and industrial production alone, which is the main indicator we consider in our analysis. For the other economies, we consider the publications of all economic series.

Table A.4 displays the probability of releasing information in another economy within the same day and in the close-open market period when China releases information.

Indeed, although the correlation is not particularly high, the days when China releases macro information tend to coincide with other economies releasing information too. However, this joint probability drops significantly on average once we focus on industrial production releases. Moreover, and with a few exceptions, this probability drops almost to zero when we condition on the close-to-open time window. News from other Asian countries, such as Japan or Singapore, happens to coincide with Chinese news during the close-open window. In fact, almost half of the releases of industrial production data in China coincide with the publication of macro information in Japan. Besides the overlap with other Asian economies, the joint probability of information releases is 0.13 for the UK. This fact could affect the

Table A.4: Probability of Joint Information Release in China and Other Countries

Country	**Same Day**		**Close-Open**	
	All	IP	All	IP
Canada	0.32	0.37	0.00	0.00
France	0.31	0.27	0.01	0.00
Germany	0.34	0.26	0.11	0.10
Hong Kong	0.10	0.15	0.00	0.00
India	0.18	0.21	0.02	0.02
Indonesia	0.10	0.17	0.08	0.12
Italy	0.36	0.35	0.00	0.00
Japan	0.53	0.47	0.53	0.47
Malaysia	0.12	0.09	0.07	0.04
Philippines	0.20	0.26	0.16	0.14
Singapore	0.13	0.18	0.11	0.19
South Korea	0.28	0.18	0.28	0.18
Taiwan	0.11	0.04	0.01	0.00
Thailand	0.13	0.04	0.06	0.03
United Kingdom	0.46	0.50	0.15	0.13
United States	0.70	0.82	0.01	0.01

Note: The table reports the probability that a macroeconomic release occurs in another country conditional on China releasing macro or industrial production (IP) information. The first two columns (Same Day) capture the probability of coinciding releases within the same calendar day. The last two columns (Close-Open) restrict to cases where the releases straddle stock market closures between one trading day and the next.

estimated effects presented in Section 3.2, so it requires further attention.

To study further this last issue, we compute the correlation of macroeconomic surprises across countries. In this case, we standardized the surprise series for Asian and G7 countries. As before, we focus on macroeconomic surprises occurring on the same day and in the close-to-open window. For each classification, we calculate the daily surprise as the mean of the country's surprises for that day, standardized by the volatility of that event type. Table A.5 shows the estimated correlations. Chinese macroeconomic surprises are uncorrelated with macroeconomic surprises of other economies. In fact, the correlation with Japanese news drops to zero in this case. The only exception is news coming from the United Kingdom, with a relatively small but still significant correlation of 0.15. Below, in Section F.5, we show the robustness of our results by adding an exercise where we control explicitly for the UK and Japan surprises that appear on the same day as China releases its information.

Table A.5: Correlation Between Chinese and Foreign Macroeconomic Surprises

Country	**Same Day**		**Close-Open**	
	All	IP	All	IP
Canada	-0.02	-0.01	–	0.00
France	0.00	0.01	0.00	-0.01
Germany	0.01	0.03	0.00	0.03
Hong Kong	0.03	0.02	–	0.00
India	0.00	0.09	0.02	0.09
Indonesia	0.06**	-0.02	0.05	-0.02
Italy	0.00	0.04	–	0.00
Japan	0.02	0.00	0.03	0.00
Malaysia	0.00	0.00	-0.02	0.00
Philippines	0.02	0.03	0.04	-0.03
Singapore	0.00	-0.02	-0.01	-0.02
South Korea	0.07**	-0.06	0.08	-0.06
Taiwan	0.04	-0.05	-0.03	-0.05
Thailand	-0.02	0.00	-0.03	0.00
United Kingdom	−0.06**	−0.15**	0.02	−0.15**
United States	0.11***	0.03	0.03	0.03

Note: Contemporaneous correlation between Chinese macroeconomic surprises (especially industrial production) and surprises in other economies, measured both over the full day (Same Day) and in the overnight Close-Open window. Significance levels: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. Dashes (–) indicate missing or inapplicable values.

C Data

This section provides a detailed description of the data sources and variables used in the analysis. We describe the construction of the Chinese macroeconomic surprise series, outline the datasets for equities, bond yields, commodity prices, and monthly macro-financial indicators, and document the cross-country coverage for both the high-frequency and monthly dynamic analyses.

C.1 Economic-Release Calendars Reviewed

We use Bloomberg's *Economic Calendar* to identify key macroeconomic announcements released on Chinese data days, carefully screening for potential overlaps with announcements in other major economies. The analysis focuses on the most market-sensitive releases, selected based on their relevance for global investors.

The monitored economies are:

- **Asia-Pacific**: China, Japan, South Korea, Singapore, Australia, New Zealand, Hong Kong
- **G7**: United States, Canada, United Kingdom, Germany, France, Italy, Japan

Robustness checks (see Section 2.3) confirm that overlapping announcements are rare outside the Asian time zone, allowing us to isolate the effect of Chinese macroeconomic surprises.

C.2 Intraday Benchmarks: Equities, Bonds, and Commodities

We compile a comprehensive set of high-frequency financial indicators to study the immediate market response to Chinese macroeconomic announcements. Table A.6 summarizes the equity indices, government bond yields, and commodity prices included in the intraday

analysis. All data are sourced from Bloomberg; equity indices are expressed in USD, and yield and commodity series align to the precise intraday windows relevant to each event.

Table A.6: Summary of Intraday Benchmarks Used in the Analysis

Category	**Region / Index / Ticker (1)**	**Region / Index / Ticker (2)**
Equity Indices	China (MXCN Index)	Australia (MXAU Index)
	Japan (MXJP Index)	South Korea (MXKR Index)
	India (MXIN Index)	Hong Kong (MXHK Index)
	Taiwan (MXTW Index)	Singapore (MXSG Index)
	Malaysia (MXMY Index)	Indonesia (MXID Index)
	Thailand (MXTH Index)	Vietnam (MXVN Index)
	Philippines (MXPH Index)	New Zealand (MXNZ Index)
Government Bond Yields	China 1-Year (CNGT1YR Govt)	China 10-Year (CNGT10YR Govt)
	US 1-Year (GT1 Govt)	US 10-Year (GT10 Govt)
Commodities	Copper (BCOMHG Index)	Aluminium (BCOMAL Index)
	WTI Crude Oil (CL1 Comdty)	Gasoline (RBOB) (XB1 Comdty)
	Agriculture Aggregate (BCOMAG Index)	

Note: All series sourced from Bloomberg. Equity indices are expressed in USD. Yield and commodity price series align to intraday windows specific to announcement timing.

C.3 Panel of Economies for Close-to-Open Estimation

Table A.7 shows all the countries used in our empirical exercises. As mentioned, these countries cover both advanced and emerging economies. For every country, we collect stock price data to construct the opening-closing specification. Moreover, all stock prices are expressed in US dollars.

Table A.7: Sample of Countries Used in the Close-to-Open Analysis

Country	Bbg. Ticker	Trading Hours	Availability	Type	Exp. Dep.	Imp. Dep.
Austria	MXAT	16:00–00:30	2009–2024	Advanced	2.3	3.3
Belgium	MXBE	16:00–00:30	2009–2024	Advanced	1.7	4.6
Canada	MXCN	22:30–05:00	1993–2024	Advanced	3.7	11.8
Denmark	MXDK	16:00–00:00	2009–2024	Advanced	3.6	6.9
France	MXFR	16:00–00:30	2009–2024	Advanced	3.5	5.2
Germany	MXDE	16:00–04:00	2009–2024	Advanced	6.0	7.2
Greece	MXGR	16:00–23:20	2009–2024	Advanced	1.4	5.9
Israel	MXIL	14:00–22:15	2002–2024	Advanced	4.9	9.1
Italy	MXIT	16:00–00:30	2009–2024	Advanced	2.6	7.2
Netherlands	MXNL	16:00–00:30	2009–2024	Advanced	1.8	14.1
Portugal	MXPT	16:00–00:30	2009–2024	Advanced	1.1	3.2
Spain	MXES	16:00–00:30	2009–2024	Advanced	1.8	6.8
Sweden	MXSE	16:00–00:25	2009–2024	Advanced	3.6	5.4
Switzerland	MXCH	16:00–00:30	2009–2024	Advanced	6.7	4.6
UK	MXGB	16:00–00:30	2009–2024	Advanced	4.1	8.9
USA	MXUS	22:30–05:00	1987–2024	Advanced	7.3	18.5
Argentina	MXAR	21:30–04:00	2002–2024	Emerging	8.0	16.8
Brazil	MXBR	21:00–04:00	2002–2024	Emerging	21.2	17.2
Chile	MXCL	21:30–04:00	2002–2024	Emerging	27.8	21.2
Colombia	MXCO	22:30–05:00	2002–2024	Emerging	5.9	18.6
Czech Rep.	MXCZ	16:00–00:20	2009–2024	Emerging	1.1	8.3
Mexico	MXMX	22:30–05:00	2002–2024	Emerging	1.5	16.8
Peru	MXPE	22:30–05:00	2002–2024	Emerging	22.2	20.7
Poland	MXPL	15:00–23:50	2009–2024	Emerging	1.0	7.5
Russia	MXRU	14:30–22:00	2002–2023	Emerging	10.1	21.0
South Africa	MXZA	15:00–23:00	2009–2024	Emerging	9.8	16.4
Turkey	MXTR	15:00–00:00	2009–2024	Emerging	1.6	10.1

Note: This table presents the 27 countries with available MSCI index data used in the *Open vs. Close* return analysis. Trading hours are shown in Shanghai time (UTC+8). Export and import dependence on China (Exp. Dep and Imp. Dep.) correspond to the average share of exports to and imports from China over total exports and imports during 2006–2024. Country classifications into Advanced and Emerging economies follow IMF definitions. Data on trade dependency are from Direction of Trade Statistics (DOTS).

D Identification Strategy and Event Windows

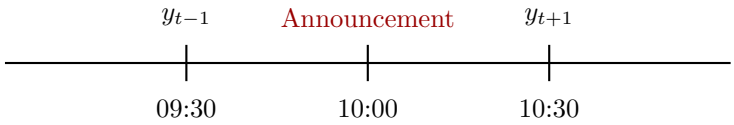
In this Section, we discuss the construction of the identification windows used to estimate the response of financial variables to Chinese macroeconomic announcements. Each window is carefully aligned with the timing of the announcement (typically 10:00 am, GMT+8) and the specific trading schedule of the asset class or market under consideration.

D.1 Stock Markets and Sovereign Yields

For Chinese equities, Asia-Pacific stock indices, and government bond yields (both Chinese and US), we construct a narrow 30-minute intraday window centered around the time of each specific macroeconomic announcement in China. A typical example is the 10:00 am release (GMT+8, corresponding to Shanghai local time), which is the standard schedule for industrial production figures. The goal of this strategy is to isolate the immediate within-day market response, focusing on periods when trading is active and liquid.

Specifically, we compare asset prices observed 30 minutes before the announcement (usually around 09:30) to those 30 minutes after (around 10:30). While this timing is simply a representative illustration, it is important to emphasize that announcement times vary across indicators and dates. Therefore, the event window is constantly adjusting to align with the latest news arrival time for each macroeconomic indicator. Figure A.7 presents a stylized example reflecting the most common setup. However, this identification strategy remains flexible to accommodate different data release schedules as discussed below.

Figure A.7: Timeline for Identification: 30-Minute Window Example



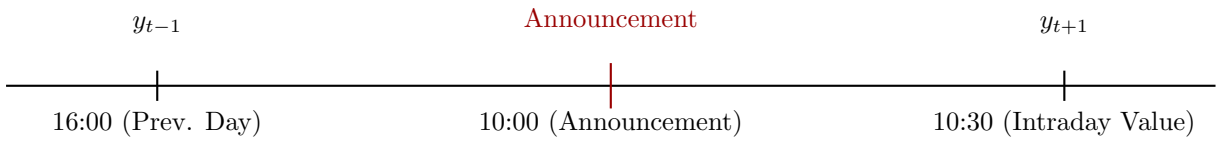
Note: The dependent variable compares the prior close (y_{t-1}) to the post-announcement window (y_{t+1}), expressed in GMT+8. This window applies to Chinese and Asia-Pacific equities, US Treasury yields, Chinese bond yields, and select commodities with overlapping intraday trading hours.

D.2 Commodities: Close vs. +30 Minutes Post

For commodities, such as copper, aluminum, oil, and agricultural products, we typically compare the previous day's close to prices 30 minutes after the announcement. We follow this approach specifically for early-morning releases (i.e, announcements scheduled at 10 am as shown in Table 1), when different commodity markets—particularly US-based contracts—are not yet open and thus cannot react in real time.

By contrast, for indicators released a bit later in the day, such as export surprises, many commodity markets are already operating at the time of the announcement. As shown in Table 1, although the difference for these remaining series is only one hour, it indeed matter as Bloomberg reports these indices (which are based on both spot and futures market data which operates continously independently of the time zone) during the most liquid time frames. In these cases, we apply the same 30-minute intraday window used for equities and yields, comparing pre- and post-announcement intraday values. Figure A.8 presents a stylized example of the early morning announcement for the effect on commodities. However, as discussed, the identification strategy becomes flexible and it's adjusted as needed depending on the timing of each specific release.

Figure A.8: Timeline for Identification: Commodities (Close vs. Intraday Value)

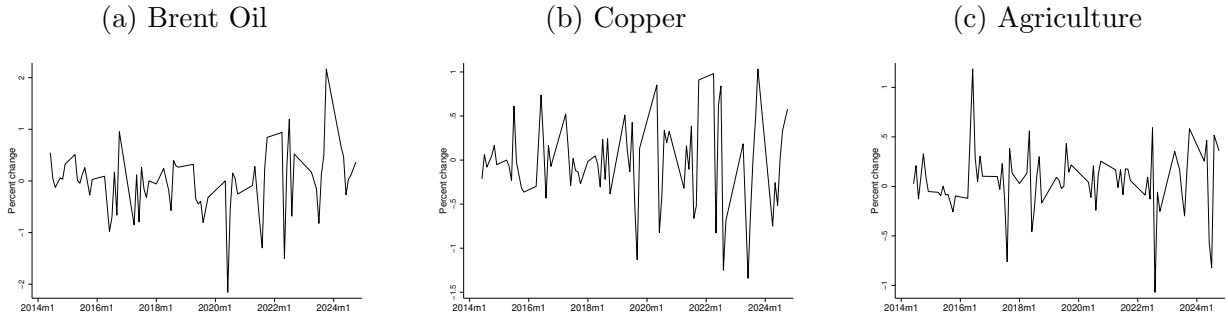


Note: The dependent variable compares the prior close (from the previous day) to the intraday value 30 minutes after the announcement, capturing within-day adjustments for commodities when markets are open at the time of release. Times are expressed in GMT+8 (Shanghai time).

Figure A.9a shows the time series of oil price adjustments around Chinese IP announcements. As noted, there are significant and abrupt changes in the oil price series, particularly after 2020, relative to the previous part of the sample. As discussed in Section 3.4, we interpret these large movements as a result of both the pandemic and the rise in

geopolitical risk that the world experienced after 2020.

Figure A.9: Commodity Prices: Change Within the Announcement Window

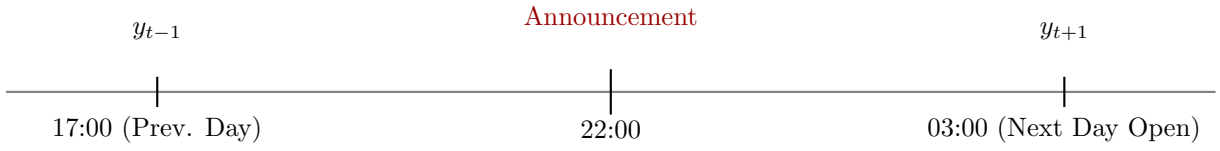


Note: This figure shows the time series of changes in commodity prices (Brent oil, Copper, and Agriculture) around the releases of Chinese industrial production. Data available from 2014 onwards.

D.3 VIX: Overnight Window, Close vs. Next-Day Open

For the VIX, which closes at 17:00 GMT-4 and reopens at 03:00 the next day, we define the dependent variable as the change from the prior close to the next-day open, capturing overnight reactions to the announcement. Figure A.10 illustrates this identification window.

Figure A.10: Timeline for Identification: VIX (Prior Close-to- Next-Day Open)



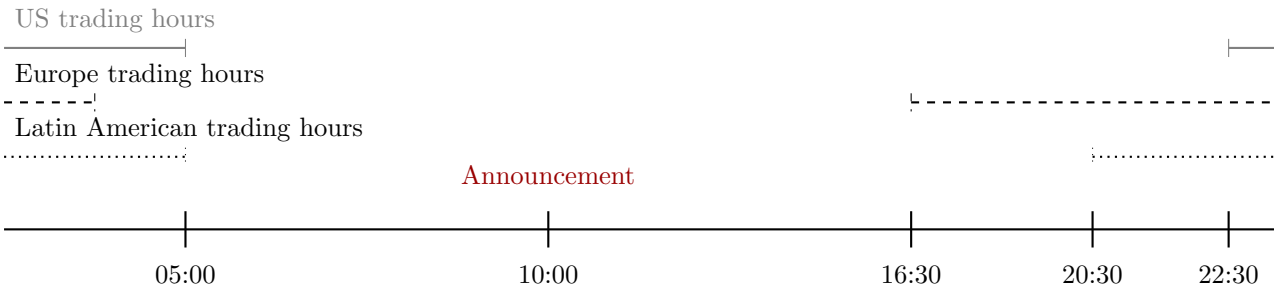
Note: The dependent variable compares the next-day open to the prior close, capturing overnight adjustments in risk sentiment following Chinese macro announcements. Times are expressed in GMT-4.

D.4 Global Equity Markets: Close-to-Open Window

For US, European, and Latin American stock indices, which are closed during Chinese announcements, we define the dependent variable as the change from the prior close to

the same-day close after absorbing overnight news. Importantly, the length of the window varies by region due to staggered trading hours: US markets close later than European or Latin American exchanges. Figure A.11 presents a stylized timeline.

Figure A.11: Timeline for Identification: Global Equity Markets (Close vs. Open)



Note: The figure illustrates staggered trading hours across global equity markets, expressed in GMT+8. Chinese macro announcements (10:00) occur between the prior close and post-announcement open in the US, Europe, and Latin America, requiring a close-vs-open identification design.

Together, these identification windows ensure that the estimated responses are attributable to Chinese announcements, while respecting the distinct trading dynamics of each market.

E Additional High-Frequency Results

This appendix presents additional high-frequency results showing how Chinese macroeconomic surprises propagate across major asset classes. We provide full, detailed tables for Asia-Pacific stock markets, US Treasury yields, and key commodity prices, using consistent event-study designs to ensure comparability across regions and instruments.

E.1 Stock Returns in Asia-Pacific Region

Table A.8 displays the effects of different types of Chines macro surprises on Chinese and rest of Asia-Pacific stock returns. Only surprises about industrial production induce a significant effect on both groups of stock returns.

E.2 US Yield - All Surprises

Table A.9 displays the estimated effects of different types of Chinese macro surprises on US Treasuries. Only surprises about industrial production induce significant effects on 10Y yields in the intraday window.

E.3 Sovereign Yields - Common Sample

As discussed in Section 3.3, we re-estimate the sovereign yield responses for China and the US using data from 2018 onward, ensuring full comparability between the two samples. The results confirm that only long-term yields respond significantly to Chinese IP surprises, while one-year yields remain unaffected. For the US, the magnitude of the response is similar to that obtained using the longer sample.

Table A.8: High-Frequency Response of Stock Markets in China and Other Asia-Pacific Countries to Chinese Macro Surprises

	China			Rest of Asia and Oceania		
	Δ_{60}	Δ_{90}	Δ_{120}	Δ_{60}	Δ_{90}	Δ_{120}
Industrial Production	21.16***	20.36***	19.60***	3.40***	4.15***	4.05***
	(6.98)	(7.05)	(6.69)	(1.30)	(1.55)	(1.50)
Observations	149	149	149	1,228	1,228	1,228
R^2	0.14	0.10	0.12	0.04	0.04	0.05
Retail Sales	5.58	3.72	8.36	3.88**	5.11***	5.64***
	(8.25)	(8.26)	(9.42)	(1.60)	(1.76)	(1.81)
Observations	147	147	147	1,228	1,228	1,228
R^2	0.17	0.09	0.11	0.05	0.05	0.05
Exports	0.89	0.91	0.80	0.35**	0.44**	0.16
	(1.04)	(1.15)	(1.25)	(0.16)	(0.20)	(0.24)
Observations	150	150	150	1,291	1,291	1,291
R^2	0.05	0.05	0.07	0.03	0.03	0.02
Imports	0.59	0.60	0.11	-0.35	-0.39	-0.40
	(1.17)	(1.29)	(1.41)	(0.24)	(0.28)	(0.33)
Observations	150	150	150	1,291	1,291	1,291
R^2	0.05	0.05	0.07	0.03	0.03	0.02
CPI	10.39	-6.28	-12.94	-4.77	-10.17	-13.12
	(35.00)	(39.03)	(41.77)	(6.82)	(7.25)	(8.31)
Observations	166	166	166	1,209	1,209	1,209
R^2	0.11	0.06	0.05	0.03	0.04	0.03
PPI	-15.83	-20.52	6.61	1.83	-2.17	5.56
	(29.27)	(32.65)	(34.94)	(6.50)	(6.72)	(6.97)
Observations	166	166	166	1,209	1,209	1,209
R^2	0.11	0.06	0.05	0.03	0.04	0.03
GDP	30.16	43.56	47.50	6.83	13.79	11.81
	(59.30)	(68.09)	(64.97)	(16.53)	(20.28)	(22.00)
Observations	55	55	55	462	462	462
R^2	0.32	0.25	0.32	0.11	0.13	0.14

Note: The countries included in the estimation are: Australia, Hong Kong, Indonesia, India, Japan, South Korea, Malaysia, New Zealand, Singapore, Taiwan, and Thailand. The panel is unbalanced across countries due to differences in market availability at the time of Chinese macroeconomic announcements, but balanced across time horizons (Δ_{60}, Δ_{90}, and Δ_{120}). The time window denotes 30 (Δ_{60}), 60 (Δ_{90}) and 90 (Δ_{120}) minutes after the release relative to 30 minutes before the release. Regressions for the "Rest of Asia and Oceania" additionally include country fixed effects. Robust standard errors are reported in parentheses. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

Table A.9: High-Frequency Response of US Treasury Yields to Chinese Macro Surprises

	US Treasury 1-Year			US Treasury 10-Year		
	Δ_{60}	Δ_{90}	Δ_{120}	Δ_{60}	Δ_{90}	Δ_{120}
Industrial Production	0.05	0.06	0.05	0.42***	0.28**	0.29**
	(0.06)	(0.06)	(0.06)	(0.10)	(0.11)	(0.13)
Observations	95	95	95	102	102	102
R^2	0.07	0.08	0.08	0.18	0.09	0.09
Retail Sales	-0.04	-0.05	-0.05	0.11	0.12	0.08
	(0.04)	(0.04)	(0.04)	(0.10)	(0.12)	(0.13)
Observations	86	86	86	91	91	91
R^2	0.13	0.16	0.17	0.13	0.06	0.04
Exports	0.01	0.01	0.01	0.00	0.01	-0.00
	(0.02)	(0.01)	(0.02)	(0.02)	(0.01)	(0.01)
Observations	98	98	98	106	106	106
R^2	0.06	0.10	0.09	0.10	0.13	0.18
Imports	-0.00	-0.03	-0.01	0.00	0.02	0.01
	(0.03)	(0.02)	(0.02)	(0.02)	(0.01)	(0.02)
Observations	98	98	98	106	106	106
R^2	0.06	0.10	0.09	0.10	0.13	0.18
CPI	-0.18	-0.15	-0.31	0.37	0.29	0.59
	(0.52)	(0.53)	(0.72)	(0.55)	(0.80)	(0.78)
Observations	104	104	104	109	109	109
R^2	0.09	0.10	0.10	0.08	0.08	0.08
PPI	0.18	0.20	0.23	-0.23	0.19	0.03
	(0.47)	(0.47)	(0.64)	(0.48)	(0.70)	(0.68)
Observations	104	104	104	109	109	109
R^2	0.09	0.10	0.10	0.08	0.08	0.08
GDP	0.03	-0.11	0.28	-0.80	0.23	0.45
	(0.42)	(0.35)	(0.68)	(1.16)	(1.22)	(1.35)
Observations	29	29	29	32	32	32
R^2	0.16	0.51	0.23	0.47	0.31	0.28

Note: The table reports the cumulative effects (in basis points) of Chinese macroeconomic surprises on US Treasury yields at 30-, 60-, and 90-minute horizons following the release. The time window denotes 30 (Δ_{60}), 60 (Δ_{90}) and 90 (Δ_{120}) minutes after the release relative to 30 minutes before the release. All regressions include year fixed effects. Robust standard errors are reported in parentheses. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

Table A.10: High-Frequency Response of Government Bond Yields to Chinese IP Surprises2

Panel A: Chinese Yields (Since 2018)						
	1-Year Yield			10-Year Yield		
	Δ_{60}	Δ_{90}	Δ_{120}	Δ_{60}	Δ_{90}	Δ_{120}
IP Surprise	-0.12	-0.15	-0.18	0.23**	0.24**	0.25**
	(0.09)	(0.12)	(0.12)	(0.11)	(0.11)	(0.12)
Observations	39	39	39	64	64	64
R^2	0.24	0.12	0.33	0.25	0.26	0.25
Panel B: United States Yields (Full Sample)						
	1-Year Yield			10-Year Yield		
	Δ_{30}	Δ_{60}	Δ_{90}	Δ_{30}	Δ_{60}	Δ_{90}
IP Surprise	0.05	0.06	0.05	0.42***	0.28**	0.29**
	(0.06)	(0.06)	(0.06)	(0.10)	(0.11)	(0.13)
Observations	95	95	95	102	102	102
R^2	0.07	0.08	0.08	0.18	0.09	0.09
Panel C: United States Yields (Since 2018)						
	1-Year Yield			10-Year Yield		
	Δ_{30}	Δ_{60}	Δ_{90}	Δ_{30}	Δ_{60}	Δ_{90}
IP Surprise	0.01	0.07	0.10	0.36***	0.27**	0.27*
	(0.07)	(0.08)	(0.09)	(0.13)	(0.13)	(0.15)
Observations	59	59	59	62	62	62
R^2	0.03	0.07	0.09	0.16	0.11	0.11

Note: This table reports the cumulative effects (in basis points) of Chinese industrial production surprises on short- and long-term government bond yields in China and the US, measured over 30-, 60-, 90-, and 120-minute time windows. Chinese bond yields refer to local-currency sovereign bonds. Intraday data for Chinese yields are available in Bloomberg only from 2018 onward, while US Treasury intraday data are available from 2013. Panel C restricts the US sample to post-2018. The number of observations for 1-year yields is occasionally lower due to differences in market liquidity and data availability. Robust standard errors in parentheses. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

E.4 Commodity Prices

For completeness, Table A.11 presents the estimated effects of Chinese IP surprises on commodity prices, including year fixed effects in all the commodity specifications. These controls can help to capture more systematic and abrupt adjustments in some specific years of the sample, particularly for the Oil price as discussed. As shown in Figure A.9a, oil prices exhibited substantial fluctuations in the latter part of the sample. To address this concern, which can be potentially relevant for other commodity prices as well, we include year fixed effects as a robustness check across all specifications. As reported in Table A.11, our main results remain stable in both magnitude and significance.

Table A.11: Effects of IP Surprises on Commodity Prices Including Year Fixed Effects

	Copper	Aluminium	WTI Oil	Brent	Agriculture
IP Surprise	0.22***	0.07**	0.21***	0.16**	0.03
	(0.08)	(0.03)	(0.07)	(0.06)	(0.03)
Observations	74	75	73	73	75
R^2	0.31	0.29	0.27	0.25	0.09

Note: This table presents the estimated effects of Chinese IP surprises including year fixed effects in all regressions. Each column corresponds to a separate regression using Bloomberg sub-indices for commodity prices. Standard errors are robust and shown in parentheses. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

Finally, and in line with the evidence discussed in Section 3.4, we provide the specific results for commodity prices using different series of Chinese surprises. Specifically, Table A.12 displays the effects for Export surprises, while Table A.13 shows the effects for GDP surprises.

Table A.12: Effects of Chinese Export Surprises on Commodity Prices

	Copper	Aluminium	WTI Oil	Brent	Agriculture
Export Surprise	0.02**	0.01	0.03**	0.03**	0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Observations	82	87	84	83	87
R^2	0.06	0.02	0.11	0.11	0.00

Note: This table reports the estimated effects of Chinese export surprises on commodity price changes. Each column corresponds to a separate regression using Bloomberg sub-indices of the Bloomberg Commodity Index (BCOM). Price changes are computed as the difference between the index value 30 minutes before and 30 minutes after the announcement. In some cases, the pre-announcement value corresponds to the previous day's close. Standard errors are robust and reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.13: Effect of Chinese GDP Surprises on Commodity Prices

	Copper	Aluminium	WTI Oil	Brent	Agriculture
GDP Surprise	0.15	-0.22	-0.04	0.92*	0.50***
	(0.36)	(0.21)	(0.31)	(0.50)	(0.15)
Observations	27	27	27	27	27
R^2	0.09	0.05	0.02	0.14	0.31

Note: This table reports the estimated effects of Chinese GDP surprises on commodity price changes. Each column represents a separate regression using Bloomberg sub-indices of the Bloomberg Commodity Index (BCOM). Price changes are computed as the difference between the index value 30 minutes before and 30 minutes after the announcement. In some cases, the pre-announcement value corresponds to the previous day's close. Standard errors are robust and reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

F Additional Close-to-Open Results

In this Section, we expand the main results by adding complementary robustness checks and timing diagnostics to strengthen confidence in the baseline findings.

F.1 Exogeneity and Timing Validation Tests

We conduct tests that assess the timing precision and exogeneity of the identified responses. Specifically, we estimate whether Chinese industrial production (IP) surprises generate measurable effects only on the announcement day (t) or whether spillovers appear on surrounding days. We apply this exercise across global stock returns and the VIX index, using a symmetric ten-day window ($t-5$ to $t+5$).

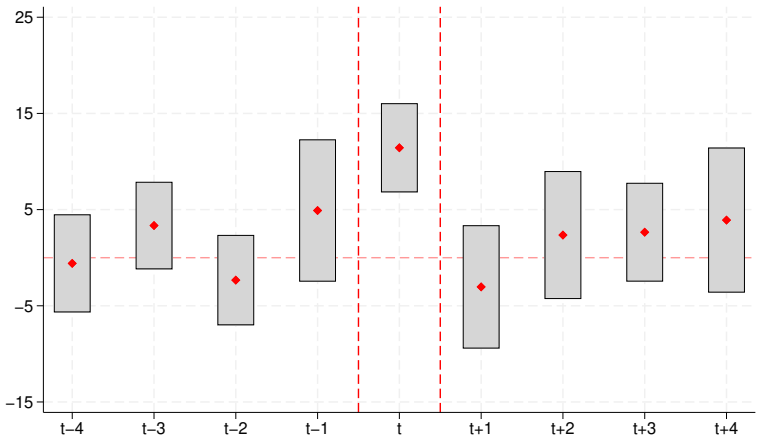
Figure A.12 displays the stock return estimates across lags and leads. The results clearly show that equity markets react sharply and exclusively on the announcement day, with no anticipatory or delayed effects detected. This supports the interpretation that IP surprises are genuinely unanticipated and exogenous to prior market conditions.

Moreover, the absence of systematic drift after the announcement suggests that, once the news is absorbed, markets return to baseline dynamics without overreaction or persistent adjustment. Together, these patterns reinforce confidence that the measured effects reflect causal responses to new information, not coincidental correlations or predictable momentum.

Figure A.13 reports the estimated effects on the VIX, confirming that risk sentiment responds sharply only on the announcement day, with no meaningful anticipatory or lagged movements. This strengthens the empirical case that our identification strategy cleanly isolates the causal impact of Chinese macroeconomic news.

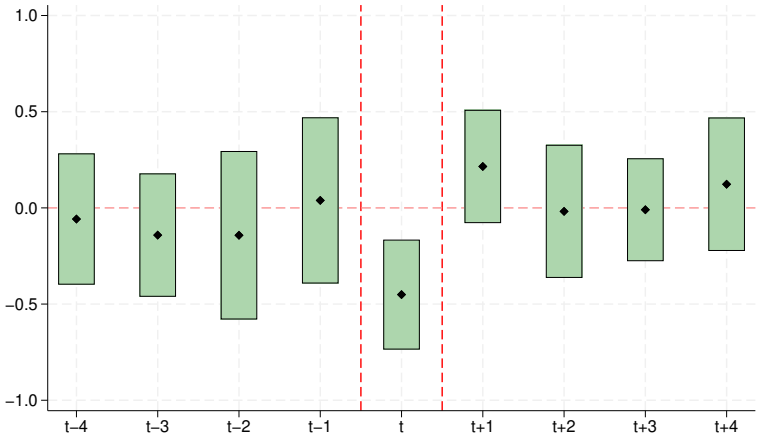
Overall, these exogeneity and timing validation tests provide clear reassurance that the empirical design accurately captures the causal influence of Chinese macroeconomic surprises on global financial markets.

Figure A.12: Timing Validation: Lagged and Lead Effects of Chinese IP Surprises on Stock Returns



Note: Estimated coefficients from regressions of global stock returns on Chinese IP surprises, covering five days before $(t-5)$ and after $(t+5)$ the announcement. The t marker denotes the announcement day. Confidence intervals are shown.

Figure A.13: Timing Validation: Lagged and Forward Effects of Chinese IP Surprises on VIX



Note: Estimated coefficients from regressions of the VIX index on Chinese IP surprises, tracking effects across $t-5$ to $t+5$. The t point marks the announcement day. Confidence intervals are plotted.

F.2 Yield Responses in Other Economies

While US Treasury yields respond consistently to Chinese macroeconomic surprises (see Section E.2), this subsection explores whether similar effects arise in other advanced economies. Specifically, we analyze the behavior of 1-year and 10-year government bond yields in Germany and the United Kingdom, using an close-to-open daily window to capture the full-day adjustment.

Table A.14 presents the estimated coefficients from regressions on Chinese industrial production (IP) surprises. The results show no meaningful response for short-term yields. However, we find statistically significant increases in 10-year bond yields in both countries, with magnitudes between 20 and 25 basis points per unit of surprise. These effects, although moderate, point to growing sensitivity of global long-term interest rates to Chinese economic news, possibly reflecting expectations about the global demand and inflation outlook shaped by China.

Table A.14: Response of Government Bond Yields to Chinese Industrial Production Surprises (Open vs Close)

	1-Year Yield	10-Year Yield
Panel A: Germany		
Industrial Production	0.09	0.22**
	(0.10)	(0.11)
Observations	158	158
R^2	0.03	0.03
Panel B: United Kingdom		
Industrial Production	0.24	0.24**
	(0.15)	(0.12)
Observations	167	167
R^2	0.02	0.03

Note: Estimated coefficients reflect the change in German and U.K. government bond yields (in basis points) in response to Chinese industrial production surprises. Changes are measured as close-to-open returns for each market. While short-term rates appear insensitive, the significant effects on 10-year yields suggest that long-term interest rate expectations in advanced economies are modestly influenced by Chinese macroeconomic signals. Robust standard errors are reported in parentheses. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

F.3 Specification with Fixed-Effects

This section discusses additional robustness exercises to complement the main close-to-open return results. We focus on the most important macroeconomic announcements, examining whether the estimated effects on market close-to-open returns are sensitive to alternative model specifications.

Table A.15 evaluates the robustness of Chinese Industrial Production surprise when varying the inclusion of fixed effects, progressively adding year and country controls. This

helps assess whether the baseline result is driven by unobserved time or cross-country heterogeneity. As noted, the magnitude and the significance of our results remain after adding year fixed-effects and then both country and year fixed-effects.

Table A.15: Effects of Chinese IP Surprise: Sensitivity to Fixed Effects Specifications

	(1) No FE	(2) Year FE	(3) Year & Country FE
IP Surprise	9.501***	9.725***	9.712***
	(2.563)	(2.601)	(2.600)
R^2	0.036	0.078	0.086
Observations	4027	4027	4027

Note: All regressions estimate the impact of China's Industrial Production surprises on close-to-open stock market returns. Column (1) includes no fixed effects; column (2) adds year fixed effects; column (3) adds both year and country fixed effects. For some specifications, missing observations for China Industrial Production are replaced by zero (see Table A.17). Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

F.4 Correlation between Country Characteristics

In this Section, we show the correlation between the eight countries' specific variables in our sample. The specific correlation and their statistical significance are shown in Table A.16. Higher levels of GDP per capita are positively correlated with both Trade and Financial openness in the sample. The degree of both export and import dependence on China is more prevalent across EMEs. The Table supports the negative relation between such dependence and income per capita.

Table A.16: Correlation Matrix of Country Characteristics Used in Heterogeneity Analysis

	EME	CN X-Dep	CN M-Dep	X/GDP	M/GDP	Trade Open	Fin. Open	GDP pc
EME	1.00	0.54*	0.73*	-0.44*	-0.54*	-0.51*	-0.59*	-0.81*
CN X-Dep		1.00	0.68*	-0.27*	-0.38*	-0.33*	-0.26*	-0.35*
CN M-Dep			1.00	-0.36*	-0.52*	-0.45*	-0.35*	-0.55*
X/GDP				1.00	0.78*	0.96*	0.41*	0.41*
M/GDP					1.00	0.92*	0.62*	0.49*
Trade Open						1.00	0.52*	0.47*
Fin. Open							1.00	0.72*
GDP pc								1.00

Note: Table shows pairwise Pearson correlation coefficients. * indicates significance at the 5% level. EME = Emerging market classification; CN X-Dep / CN M-Dep = Share of exports/imports to/from China; X/GDP, M/GDP = Exports/imports as % of GDP; Trade Open = (Exports + Imports)/GDP; Fin. Open = External assets + liabilities over GDP; GDP pc = GDP per capita (USD millions).

F.5 Stock Returns and Simultaneous Announcements

We now turn to assessing whether the presence of macroeconomic news from other countries may influence both the significance and magnitude of our baseline results. For doing so, we re-estimate the impact on global stock returns using our country panel closed-open specification, while incorporating surprises from other major economies that are released on the same day as China. The motivation for this extension is twofold. First, as discussed in Section B.2,

nearly half of China's macroeconomic announcements coincide with the release of Japanese indicators. While Japan may not equate China in terms of global economic weight, it remains a major G7 economy. This obviously increases the possibility of overlapping information effects. Moreover, as argued, UK releases also tend to coincide with Chinese announcements. Therefore, we add the specific surprise series that are published on the same day as China for the two economies to our baseline estimation. Second, if surprises from these other G7 countries are also found to significantly affect global stock returns, this could suggest that the observed reactions are capturing broader expectations about global growth conditions, rather than responses driven by the publication of higher-than-expected numbers for IP in the Chinese economy alone.[16]

Table A.17 presents the results from extending our baseline specification by progressively incorporating additional macroeconomic surprises from China (Retail Sales, GDP), Japan (GDP, Industrial Production, PPI, Core Inflation), and the United Kingdom (GDP, Retail Sales, CPI, Unemployment). As mentioned, we add these specific series since their publication coincides with Chinese figures. The surprises are standardized to ease magnitude comparability. In the first four columns, the sample is restricted to days with actual macroeconomic announcements from China. However, since not all Chinese releases necessarily coincide with announcements from the other two countries, Column (5) expands the sample to include Japanese and UK surprises even on days when there are no publications in China. On those days, we naturally set the Chinese surprises equal to zero. Through the specification, we can test the robustness and stability of our results using an extended sample while ensuring that non-Chinese announcements are not wrongly omitted.

After controlling for surprises from Japan and the UK, both the significance and magnitude of the Chinese IP surprise remain robust. Consistent with our baseline findings, positive surprises in Chinese IP continue to generate an average increase of approximately 9.5

[16]In this sense, while the evidence in Section B.2 shows that the appearance of news also coincides with other smaller Asian economies such as Singapore, Philippines and South Korea (to name a few) we prefer to focus on G7 economies for their relevance for global growth.

Table A.17: Macroeconomic Surprises: Progressive Model Specifications

	(1)	(2)	(3)	(4)	(5)
China Industrial Production	9.501***	9.544***	9.621***	10.27***	9.571***
	(2.563)	(2.601)	(2.628)	(2.817)	(2.603)
China Retail Sales		-0.842	-0.581	-2.376	-0.678
		(3.828)	(3.924)	(4.017)	(3.874)
China GDP			-8.674	-10.89	-8.757
			(21.41)	(21.64)	(20.53)
Japan GDP				5.663**	0.172
				(2.570)	(0.506)
Japan Industrial Production				14.17	-0.374
				(12.72)	(0.562)
Japan PPI				-1.497	-0.907**
				(1.006)	(0.440)
Japan Core Inflation				0.811	0.393
				(2.325)	(0.588)
UK GDP				2.191	0.417
				(1.419)	(0.552)
UK Retail Sales				1.394	0.065
				(1.890)	(0.607)
UK CPI				-2.716*	0.147
				(1.504)	(0.482)
UK Unemployment				-2.142***	-0.593
				(0.682)	(0.493)
R^2	0.036	0.036	0.037	0.056	0.001
Observations	4027	4027	4027	4027	111267

Note: All regressions estimate the impact of the most important macroeconomic surprises on close-to-open stock market returns. Column (1) includes only China Industrial Production; column (2) adds China Retail Sales; column (3) adds China GDP; column (4) includes additional variables from Japan (GDP, Industrial Production, PPI, Core Inflation) and the UK (GDP, Retail Sales, CPI, Unemployment); column (5) extends the sample by replacing missing China Industrial Production observations with zeros, as these events were not repeated on announcement days. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

basis points in global stock returns. As shown in column (4), higher-than-expected figures for Japan's GDP and the UK's unemployment rate also produce significant stock market reactions when included. However, once we expand the sample to include all days with announcements from any of the three countries, regardless of whether China releases data or

not, the effects of Japanese and UK surprises vanish, while the effect of Chinese IP surprise remains. This suggests that the influence of Japanese and UK news on global returns occurs only when it coincides with Chinese IP announcements. We interpret this as suggestive evidence that the appearance of Chinese news spillover to other signals, as it amplifies the perceived relevance of other macroeconomic news from other countries. Moreover, if the observed stock market reactions were primarily driven by improving global conditions, we would expect news from other G7 economies to matter independently of whether China publishes new data or not. As noted, our results suggest otherwise.

F.6 Asymmetric Responses to the Sign and Magnitude of Surprises

In this section, we extend the baseline close-to-open analysis to explore whether stock market responses to Chinese macroeconomic surprises vary depending on their *sign* (positive vs. negative) and *magnitude* (large vs. moderate).

We first estimate asymmetric responses by sign, modifying the baseline regression to allow for separate effects of positive and negative news:

$$\Delta y_{i,t} = \alpha_i + \gamma^{+}\left(s_{CHI,\tau} \cdot \mathbb{1}[s_{CHI,\tau} > 0]\right) + \gamma^{-}\left(s_{CHI,\tau} \cdot \mathbb{1}[s_{CHI,\tau} < 0]\right) + \beta X_{\tau} + \varepsilon_{i,t} \qquad (8)$$

where $\mathbb{1}[s_{CHI,\tau} > 0]$ equals 1 if the surprise is positive and 0 otherwise, and $\mathbb{1}[s_{CHI,\tau} < 0]$ equals 1 if the surprise is negative. This specification uses the full close-to-open panel and reports separate marginal effects for positive and negative news across all Chinese macro indicators.

We then examine whether the *magnitude* of the surprise matters. We classify a *large* surprise as any observation where the absolute size of the shock exceeds ± 1.5 standard

Table A.18: Asymmetric Effects of Chinese Macro Surprises on Open-Close Stock Returns

	Ind Prod	Retail Sales	Exports	Imports	CPI	PPI	GDP
Positive Surprise	16.47***	1.95	0.78*	-0.24	41.09	-31.79	-27.23
	(5.05)	(9.96)	(0.40)	(0.85)	(43.41)	(25.70)	(39.70)
Negative Surprise	-5.22**	-0.21	-0.35	-0.55	11.52	3.80	-80.75
	(2.09)	(9.50)	(0.53)	(0.81)	(32.19)	(16.70)	(55.93)
Observations	4,027	3,750	3,741	3,750	3,712	3,530	1,467
R^2	0.036	0.002	0.007	0.003	0.000	0.002	0.011

Note: This table reports the estimated asymmetric effects of positive and negative Chinese macroeconomic surprises on close-to-open stock returns. Robust standard errors are reported in parentheses. Statistical significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

deviations, and a *moderate* surprise as one within that band. We estimate:

$$\Delta y_{i,t} = \alpha_i + \gamma^L \left(s_{CHI,\tau} \cdot \mathbb{1}[|s_{CHI,\tau}| > 1.5\sigma]\right) + \gamma^M \left(s_{CHI,\tau} \cdot \mathbb{1}[|s_{CHI,\tau}| \leq 1.5\sigma]\right) + \beta X_\tau + \varepsilon_{i,t} \quad (9)$$

where γ^L captures the marginal effect of large surprises, and γ^M captures the effect of moderate ones.

As discussed in Section 4.3, the evidence suggests that positive IP surprises have a larger positive impact on worldwide stock returns compared to their negative counterparts. On the other hand, there is no significant difference as a function of the size of the surprise.

Table A.19: Effect of Moderate vs. Large Chinese Macro Surprises (±1.5 Standard Deviations) on Open-Close Stock Returns

	Ind Prod	Retail Sales	Exports	Imports	CPI	PPI	GDP
Large Surprise	9.03***	5.77	0.50*	0.01	6.79	-13.37	-9.36
	(3.14)	(5.80)	(0.29)	(0.63)	(18.83)	(14.37)	(26.91)
Moderate Surprise	11.16***	-3.42	0.74	0.22	7.46	-19.82	51.30
	(3.74)	(8.47)	(0.65)	(0.56)	(22.74)	(20.87)	(36.91)
Observations	4,027	3,750	3,741	3,750	3,712	3,530	3,750
R^2	0.086	0.058	0.039	0.039	0.015	0.017	0.142

Note: This table reports the estimated effects of moderate and large Chinese macroeconomic surprises (defined as above or below ±1.5 standard deviations) on close-to-open stock returns. Robust standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

F.7 Time Dependence in the Effect of Chinese Surprises

This section examines whether the global stock market response to Chinese macroeconomic announcements has changed over time, as a reflection of China's rising prominence in the global economy. In 2016, China overtook the United States as the world's largest economy in purchasing power parity (PPP) terms and further deepened its integration with global trade and financial markets. It is therefore relevant to assess whether international financial markets have become more (or less) sensitive to Chinese economic news in recent years.

We begin by focusing on China's industrial production surprise, the indicator that consistently yields the strongest and most robust effects in our regressions. Specifically, we estimate the following specification:

$$\Delta y_{i,t} = \alpha_i + \gamma_1 \, s^{IP}_{CHI,\tau} + \gamma_2 \, (\mathbb{1}_{\text{Post2016}} \times s^{IP}_{CHI,\tau}) + \beta X_\tau + \varepsilon_{i,t} \tag{10}$$

where $\Delta y_{i,t}$ is the close-to-open stock return for country i on day t, $s^{IP}_{CHI,\tau}$ is the Chinese industrial production surprise on the time window τ, and $\mathbb{1}_{\text{Post2016}}$ is a dummy equal to 1 for observations from 2016 onward (the PPP crossover year) and 0 otherwise. The coefficient γ_1 captures the average effect prior to 2016, while γ_2 measures the differential effect after 2016. Table A.20 displays the estimated coefficients.

The results indicate that, on average, Chinese industrial production surprises generated a statistically significant impact on global stock markets before 2016 ($\gamma_1 = 7.01$), with an additional amplification effect of 4.54 units after 2016 (γ_2). This suggests that international markets have become increasingly sensitive to Chinese economic news in the years following China's rise as the world's largest economy in PPP terms, underscoring China's growing influence in shaping global financial dynamics.

Table A.20: Time Variation in the Effect of China's Industrial Production Surprise on Global Stock Returns (Open-Close)

	Open-Close Return
IP Surprise	7.01***
	(1.16)
IP Surprise × Post-2016	4.54***
	(1.55)
Observations	4,027
R^2	0.038

Note: This table reports the estimated close-to-open effects of China's industrial production surprises on global stock returns, including an interaction term for the post-2016 period (the year China surpassed the US in PPP terms). The baseline coefficient captures the average effect prior to 2016, while the interaction coefficient measures the incremental change afterward. Robust standard errors are reported in parenthesis. Statistical significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

G Daily Responses to Chinese IP Surprises

In this Section we present the daily (close-to-close) responses of stock returns, Treasury yields, commodity price and the VIX using daily data. While during this extended time window more events may occur, this analysis is useful to assess the persistence of the estimated effects presented in the paper. Systematic releases of information that happen within the same day may induce a bias in the estimated effects, obscuring their causal interpretation. Table A.21 displays the estimated effects, including and excluding controls. The effect on some variables, like the US Treasury, increases in this extended window relative to the tight window around the announcement. For example, a 1 percentage point surprise in industrial production induces an increase of 1.14 basis points in the 10Y Treasury yield. All the effects are qualitatively in line and significant relative to the baseline. These results are consistent with the evidence on the persistence effects of Chinese macro surprises on asset prices presented in Section 5.4.

Table A.21: Effect of Industrial Production Surprise on Asset Prices (Close-to-Close)

Asset	Without Controls	With Controls
MSCI AE		
Estimate	17.934*	17.237*
Standard Error	(9.697)	(9.093)
R^2	0.002	0.061
Observations	4956	4946
MSCI EM		
Estimate	18.736**	17.190**
Standard Error	(8.403)	(8.327)
R^2	0.004	0.055
Observations	4956	4946
Treasury 1Y		
Estimate	-0.615	-0.580
Standard Error	(0.404)	(0.399)
R^2	0.001	0.106
Observations	4143	4138
Treasury 10Y		
Estimate	1.139*	1.222**
Standard Error	(0.621)	(0.616)
R^2	0.001	0.136
Observations	4143	4138
Commodity Index		
Estimate	0.246**	0.238**
Standard Error	(0.096)	(0.097)
R^2	0.004	0.095
Observations	4968	4958
VIX		
Estimate	-1.166*	-1.243*
Standard Error	(0.698)	(0.694)
R^2	0.001	0.086
Observations	4956	4951

Note: This table reports the estimated close-to-close effects of China's industrial production surprises on global stock returns, US Treasury yields, commodity prices and the VIX. Robust standard errors are reported in parenthesis. Statistical significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

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