Information in the A-H Premium*

Jennifer N. Carpenter
NYU Stern School of Business

Robert F. Whitelaw
NYU Stern School of Business and NBER

Dongchen Zou
Indiana University Kelley School of Business

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Abstract

There are 149 Chinese firms with A shares listed on the mainland China stock exchanges and twin H shares dual-listed on the Hong Kong stock exchange. The prices of the A shares have historically exceeded those of their corresponding H shares by more than 50% on average. Since these securities generate identical cash flows, this price differential reflects the difference in the discount rates applied by mainland Chinese investors and global investors outside of mainland China. However, traditional return predictors fail to explain this difference. This paper presents evidence that the A-H premium reflects a China bias among global investors and partially explains the return dynamics of China-related stocks traded outside China.

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1 Introduction

There are 149 Chinese firms with A shares listed on the mainland China stock exchanges and twin H shares dual-listed on the Hong Kong stock exchange, which have a combined market capitalization of over 3 trillion USD. The prices of the A shares have historically exceeded those of their twin H shares by 50% or more on average.[1] Since twin A and H shares are claims to the same stream of dividends, the difference in their prices reflects the difference in the discount rates applied by mainland Chinese investors and investors outside of mainland China. However, over most of our sample period 2001-2022, interest rates in mainland China have been much higher than those in Hong Kong, which match those in the US, as the HKD is tightly pegged to the USD. The three-month government bond rate in China exceeded that in the US by 1.13% on average and the ten-year government bond rate in China exceeded that in the US by 0.52% on average. At the same time, the realized equity risk premium in the A-share market has been comparable to that in the Hong Kong market, 4.01% vs. 4.25%, respectively. Thus, the higher discounting of H shares relative to A shares represents a puzzle.

Figure 1 plots the time series of the value-weighted average A-H premium together with the time series of the difference between the US and China three-month rates. As the figure shows, variation in the interest rate differential does little to explain variation in the A-H premium; their correlation is 10%. In particular, the recent rate hike in the US and easing in China at the same time has had little effect on the average A-H premium.

This paper presents evidence that the A-H premium reflects a bias against Chinese assets among global investors. We begin by developing a concise theoretical framework for understanding the A-H premium in a general Gordon growth model. A key insight of the model is that, given that the markets are segmented and the cross-listed stocks earn the same expected cash flows, the A-H premium should reflect the difference in effective discount rates between mainland Chinese investors and global investors trading in Hong Kong.

Empirically, we test the model implication for the A-H premium as the difference in effective discount rates with predictive regressions of return differentials on H shares and A shares. We find that traditional return predictors from the asset pricing literature have little power to explain the H minus A stock return differential, either in the cross-section or in the time series, while the lagged A-H premium has significant incremental explanatory power. Our finding suggests that the A-H premium captures the discount rate differences beyond

[1] This price differential does not represent an arbitrage opportunity, which would require being able to buy an H share and short an A share indefinitely, but it does constitute a severe violation of the law of one price and reflects significant segmentation between the Chinese securities markets and global securities markets.

observable determinants. Crucially, one factor that the A-H premium can capture is the bias of global investors against Chinese stocks.

Finally, we present three pieces of corroborating evidence that the A-H premium contains information about a China bias in asset prices outside of mainland China. First, we show that the change in the average log A-H premium is significantly negatively related to returns on and fund flows into U.S. equity mutual funds that focus on the broad China region. Second, we find that the returns of U.S. stocks that are more Chinese by various measures are significantly more negatively associated with the change in the average log A-H premium. Our measures of stock-level Chinese characteristics include the market beta on the A-share index, the estimated proportion of a firm's revenues from mainland China, whether China is mentioned in the company filings, and firm-level measures of sentiment and risk perception towards China from Hassan, Schreger, Schwedeler, and Tahoun (2021). Third, we find that the returns of China-related Hong Kong stocks, such as H-shares and Red Chips,[2] are significantly more negatively associated with the change in the average log A-H premium than other stocks traded in Hong Kong. These results are all consistent with the hypothesis that the A-H premium is positively associated with a bias against China or Chinese characteristics.

Our paper contributes to a nascent literature on the A-H premium. Birtch and McGuinness (2008) attribute the convergence of A- and H-share prices over the period 2001-2005 to the anticipation of the unlock of non-tradable shares in China. Arquette, Brown Jr, and Burdekin (2008) attribute this premium to exchange rate expectations and investor sentiment. Cai, McGuinness, and Zhang (2011) estimate a statistical co-integration model of A and H-share prices. More recently, Vandeweyer, Yang, and Yannelis (2023) find that a surprise cut in the US policy rate lead to increases in the A-H premia over the subsequent five days. He, Wang, and Zhu (2023) find that a higher A-H premium is associated with negative (positive) and significant northbound (southbound) flows in the stock Connect program that links the Chinese and Hong Kong stock markets, consistent with their cross-market arbitrage hypothesis. In particular, using the costodian-level data, the authors document that the A-H premium is negatively associated with flows from foreign investors into the A-share market. A number of authors have also studied the A-B premium and relate it variously to infor-

[2] Chinese firms have a range of incorporation and listing options and are traded on stock exchanges around the world. The focus of this paper is on A shares and H shares, which are both issuances of firms that are incorporated in mainland China. There are also B shares, which are incorporated and listed in mainland China, but are tradable by foreign investors in USD or HKD. B-share issuance has become negligible since the China Securities Regulatory Commission (CSRC) introduced the Qualified Foreign Institutional Investors (QFII) program in 2002, which allows QFIIs to buy A shares. So-called Red-chips and P-chips are issuances of Chinese SOEs and private firms, respectively, incorporated outside mainland China, such as in Hong Kong, the Cayman Islands, the British Virgin Islands, or Bermuda, and listed on the Stock Exchange of Hong Kong (SEHK). N shares are issuances of Chinese firms incorporated outside China and listed on the NYSE or NASDAQ.

mation asymmetry across domestic and foreign investors, liquidity differences, the relative supply of A shares, differential short sale constraints, and political risk (Chakravarty, Sarkar, and Wu, 1998; Chen, Lee, and Rui, 2001; Fernald and Rogers, 2002; Chan and Kwok, 2005; Chan, Menkveld, and Yang, 2008; Mei, Scheinkman, and Xiong, 2009; Karolyi, Li, and Liao, 2009).

Our paper also relates to the recent literature on expected returns of assets when investors derive non-pecuniary utility from holding these assets. For example, Hong and Kacperczyk (2009) find that "sin" stocks such as tobacco, gaming, and alcohol producers earn higher expected returns than other stocks, as a compensation for social concerns. Zerbib (2019) and Baker, Bergstresser, Serafeim, and Wurgler (2022) show that the yields of green bonds are lower than that of comparable non-green bonds, and that these bonds have higher ownership concentration, consistent with the hypothesis of pro-environmental preferences in bond prices. Pástor, Stambaugh, and Taylor (2021) provide a theoretical framework that generates a two-factor model for the pricing of green assets. They show that in equilibrium, ESG preferences and hedging motives result in a negative risk premium on the ESG factor, and yet green assets can outperform traditional ones when there are shocks, such as shifts in tastes towards sustainable investing. Pástor, Stambaugh, and Taylor (2022) provide an empirical analysis of risk premiums on green stocks, and find that the high historical returns can be attributed to the increasing environmental concerns of investors. In our paper, we find evidence that the A-H premium contains information on the preference not to hold stocks or funds that are more Chinese, namely a China bias. The large and positive A-H premium suggests a non-pecuniary cost to international investors in holding Chinese-related assets.

The paper proceeds as follows. Section 2 develops a model of the A-H premium that illustrates the effect of differential required returns. Section 3 presents evidence on the cross-sectional and time-series determinants of H-A return differentials. Section 4 presents evidence on the China bias in the pricing of stocks outside of China. Section 5 concludes.

2 A Model of the A-H Premium

To make explicit the relation between A-H premia and the different returns required in the mainland China and Hong Kong stock markets, this section develops a tractable model of the A-H premium in which the price of the firm's stock in each market is as in a generalized Gordon growth model. Suppose stock i delivers a continuous stream of cash flows $C_{i,t}$ described by

$$\frac{dC_i}{C_i} = g_i\, dt + v_i dB_i \ , \tag{1}$$

where B_i is a standard Brownian motion and the cash flow growth rate, g_i, and volatility, v_i, are constant. Suppose that in each market $j = A$ or H, there is a riskless asset appreciating at rate r_j.

2.1 One Priced Risk Factor

For ease of exposition, first assume that in each market $j = A$ or H, there is a single priced risk factor represented by a standard Brownian motion B_j, and a factor-mimicking portfolio with value X_j that evolves according to

$$\frac{dX_j}{X_j} = \mu_j \, dt + \sigma_j \, dB_j \ . \tag{2}$$

For example, we can interpret this as the market portfolio in a CAPM setting. The Sharpe ratio paid by the priced factor in market j is $\theta_j = (\mu_j - r_j)/\sigma_j$, and the stochastic discount factor process, M_j, that summarizes pricing in market j is

$$M_{j,t} = e^{-r_j t - \theta_j B_{j,t} - \theta_j^2 t/2} \ , \tag{3}$$

in the sense that, at any time t, investors in market j price a given payoff C_u at time $u > t$ as

$$V_t = \mathrm{E}_t\{\frac{M_{j,u}}{M_{j,t}} C_u\} \ . \tag{4}$$

Suppose the correlation between stock i's cash flow and market j's priced risk factor is $\rho_{i,j}$. As in the standard CAPM, we can decompose stock i's cash flow shocks into a component that is perfectly correlated with priced factor j and an uncorrelated residual:

$$\frac{dC_i}{C_i} = g_i \, dt + v_i(\rho_{i,j} \, dB_j + \sqrt{1 - \rho_{i,j}^2} dZ_{i,j}) \ , \tag{5}$$

where $Z_{i,j}$ is a standard Brownian motion uncorrelated with B_j. By assumption, $Z_{i,j}$ is not a priced risk in market j, and the cash flows of stock i are priced according to equation (4). So the price process $P_{i,j}$ of stock i in market j is

$$P_{i,j,t} = \int_t^\infty \mathrm{E}_t\{\frac{M_{j,u}}{M_{j,t}} C_{i,u}\} \, du \ . \tag{6}$$

For the purpose of computation, this can be written as

$$P_{i,j,t} = \lim_{T \to \infty} \int_t^T \mathrm{E}^*_{j,t}\{e^{-r_j(u-t)} C_{i,u}\} \, du \ , \tag{7}$$

where the expectation is under the risk-neutral measure $\mathcal{P}^*_{j,T}$ given by

$$\frac{d\mathcal{P}^*_{j,T}}{d\mathcal{P}} = e^{r_j T} M_{j,T} \ , \tag{8}$$

under which

$$B^*_{j,t} \equiv B_{j,t} + \theta_j t \tag{9}$$

is a Brownian motion with zero drift. Equation (5) can be rewritten as

$$\frac{dC_i}{C_i} = (g_i - v_i \rho_{i,j} \theta_j)\, dt + v_i(\rho_{i,j}\, dB^*_j + \sqrt{1-\rho^2_{i,j}} dZ_{i,j}), \tag{10}$$

so under $\mathcal{P}^*_{j,T}$, the growth rate of C_i is

$$g^*_{i,j} = g_i - v_i \rho_{i,j} \theta_j = g_i - \beta_{i,j}(\mu_j - r_j) \ , \tag{11}$$

where

$$\beta_{i,j} = \rho_{i,j} v_i / \sigma_j \tag{12}$$

is stock i's beta with respect to market j's factor-mimicking portfolio. Substituting

$$\mathrm{E}^*_{j,t}\{C_{i,u}\} = C_{i,t} e^{g^*_{i,j}(u-t)} \tag{13}$$

into equation (7) gives

$$P_{i,j,t} = \frac{C_{i,t}}{r_j - g^*_{i,j}} = \frac{C_{i,t}}{r_j + \beta_{i,j}(\mu_j - r_j) - g_i} = \frac{C_{i,t}}{r_j + v_i \rho_{i,j} \theta_j - g_i} \ , \tag{14}$$

assuming $g_i < r_j + \beta_{i,j}(\mu_j - r_j)$. Therefore, the A-H premium for stock i is

$$\frac{P_{i,A,t}}{P_{i,H,t}} = \frac{r_H + \beta_{i,H}(\mu_H - r_H) - g_i}{r_A + \beta_{i,A}(\mu_A - r_A) - g_i} = \frac{r_H + v_i \rho_{i,H} \theta_H - g_i}{r_A + v_i \rho_{i,A} \theta_A - g_i} \ . \tag{15}$$

2.2 Multiple Priced Risk Factors

Alternatively, suppose there are K risk factors in market j, with mimicking portfolios given by

$$\frac{dX_{j,k}}{X_{j,k}} = \mu_{j,k}\, dt + \sigma_{j,k}\, dB_j \ , \tag{16}$$

for $k = 1, \ldots, K$, where the $\sigma_{j,k}$ are row vectors and B_j is K-dimensional vector of independent Brownian motions. Then we obtain a multi-dimensional version of the one-factor model above. The stochastic discount factor process that summarizes pricing in market j is

$$M_{j,t} = e^{-r_j t - \theta_j' B_{j,t} - |\theta_j^2| t/2} \ . \tag{17}$$

where

$$\theta_j = \sigma_j^{-1}(\mu_j - r_j 1) \ , \tag{18}$$

σ_j is the matrix whose kth row is $\sigma_{j,k}$, and μ_j is the vector of the $\mu_{j,k}$. We can write the evolution of firm i's cash flow stream in terms of the components that are perfectly correlated with the K risk factors and a residual component as follows:

$$\frac{dC_i}{C_i} = g_i \, dt + v_i(\rho_{i,j} \, dB_j + \sqrt{1 - |\rho_{i,j}|^2} dZ_{i,j}) \ , \tag{19}$$

where $\rho_{i,j}$ is a row vector of the $\rho_{i,j,k}$, the instantaneous correlations of firm i's cash flows with the K risk factors in market j.

Following the same logic as in the case of a single priced risk factor above,

$$P_{i,j,t} = \frac{C_{i,t}}{r_j - g_i^*} = \frac{C_{i,t}}{r_j + v_i \rho_{i,j} \theta_j - g_i} \ . \tag{20}$$

If $\sigma_{j,k}$ is diagonal, i.e., if the factors are independent, then this becomes

$$P_{i,j,t} = \frac{C_{i,t}}{r_j - g_i^*} = \frac{C_{i,t}}{r_j + \sum_k \beta_{i,j,k}(\mu_{j,k} - r_j) - g_i} \ , \tag{21}$$

where $\beta_{i,j,k} = \rho_{i,j,k} v_i / \sigma_{j,k}$. The A-H-premium of stock i is

$$\frac{P_{i,A,t}}{P_{i,H,t}} = \frac{r_H + v_i \rho_{i,H} \theta_H - g_i}{r_A + v_i \rho_{i,A} \theta_A - g_i} = \frac{\mu_{i,H} - g_i}{\mu_{i,A} - g_i} \ , \tag{22}$$

where $\mu_{i,j} \equiv r_j + v_i \rho_{i,j} \theta_j$ is the required expected return in market j. Therefore,

$$\log \frac{P_{i,A,t}}{P_{i,H,t}} = \log(\mu_{i,H} - g_i) - \log(\mu_{i,A} - g_i) \ , \tag{23}$$

which is monotonically increasing in the required return differential $\mu_{i,H} - \mu_{i,A}$.

3 A-H premia and H-A Return Differentials

Table 1 presents evidence on the cross-section of A-share returns on dual-listed firms in Panel A, H-share returns on dual-listed firms in Panel B, and H-share minus A-share return differentials in Panel C. The predictor variables include traditional firm and stock characteristics used in the literature as well as A-H premia, based on data from Wind, CSMAR, and Datastream. For the firm-level characteristics size and book-to-market, we use the sum of the market capitalizations of the A-shares and the H-shares. For the stock-level characteristics CAPM beta (Beta), illiquidity (Illiq), return volatility (Vol), and maximum daily return over the previous month (Max), we include both measures for the A-shares and measures for the H-shares.

Specification (1) is a regression of A-share returns on both the A and H versions of all the traditional return predictors, and Specification (2) includes the A-H premium as a predictor as well. All of the coefficient estimates on the H-share characteristics are statistically insignificant, and Specifications (3) and (4) show the regression results excluding these variables. Among the traditional return predictors, the coefficient estimates for Illiq and Vol are significantly positive, and those for Max are significantly negative, consistent with previous literature on US stock returns. The inclusion of the A-H premium strengthens these significance levels slightly.

Specification (5) is a regression of H-share returns on the same full set of return predictors, and Specification (6) also includes the A-H premium. In this case, two of the A-share characteristics are statistically significant, Vol and Max, but we still present the results in Specifications (7) and (8) where all of these A-share characteristics are excluded. Interestingly, the coefficients on Vol(H) and Max(H) decline in magnitude and become less statistically significant in these latter specifications. Moreover, the signs of the coefficients on the H-share predictors are the opposite of those on the A-share predictors. These results suggest that it may be the difference between these characteristics in the H and A markets that is priced in the H market. However, the signs of the coefficients on Vol and Max, the two most statistically significant predictors, are again consistent with the results from US stock returns. Again, the inclusion of the A-H premium increases the significance levels slightly.

Specifications (2) and (4) show that the A-H premium strongly negatively predicts A-share returns, even when controlling for traditional firm characteristics. This suggests that the A-H premium contains information about relative mispricing among A-shares, with relatively overpriced A shares having higher A-H premia and lower subsequent returns. Similarly, Specifications (6) and (8) show that the A-H premium strongly positively predicts H-share returns, even controlling for traditional firm characteristics. This suggests that the A-H premium contains information about relative mispricing among H-shares, with relatively underpriced H shares having higher A-H premia and lower subsequent returns.

Specification (9) is a regression of H-share minus A-share return differentials on all the traditional return predictors, and Specification (10) includes the A-H premium as a predictor as well. In Specification (10), coefficient estimates for Beta (A), Illiq (A), and Max(H) are significantly negative, while those for Vol(A) and Max(H) are significantly positive, as one might expect based on results for US stock returns. The coefficient estimate on Size is significantly positive, perhaps reflecting the fact that in the single-return regressions, the size discount is more pronounced for A shares than for H shares. The inclusion of the A-H premium reverses the sign of the Size coefficient estimate, reflecting the large negative cross-sectional correlation between Size and the A-H premium. At the same time, the coefficient on the A-H premium is highly significantly positive.

The strong significance of the A-H premium as a return predictor across all of the regressions suggests that this variable contains important incremental information about expected returns, over and above that embedded in traditional firm and stock characteristics.

4 The China Bias

In this section, we demonstrate that the A-H premium is related to a bias against Chinese stocks among global investors, namely "China bias". In particular, we find that (1) U.S. mutual funds which specialize in the broad China stock market experience negative returns and outflows when the A-H premium is higher; (2) returns of U.S. stocks that exhibit higher relatedness with Chinese markets are more sensitive to changes in A-H premium; and (3) returns of Hong Kong stocks that are Mainland-Chinese-related are more sensitive to changes in A-H premium.

4.1 Mutual Funds

We start by examining the effect of the A-H premium on U.S. mutual funds that focus on China. The idea is that, if a higher A-H premium corresponds to a larger bias among global investors against Chinese stocks, then this higher premium will be associated with a higher effective discount rate for global investors on these stocks. In particular, mutual funds with global investors will experience a decrease in net asset value (NAV) due to a higher effective discount rate for its Chinese portfolio, and larger outflows when international investors withdraw from the China region. Here, we focus on US mutual funds because these funds are readily accessible by global investors.

4.1.1 Data and Variable Construction

We use the CRSP mutual fund database for analyzing U.S. mutual funds. The CRSP mutual fund database covers the universe of U.S. mutual funds, with the summary of fund characteristics such as fund type, total net assets (TNA), and net asset value (NAV), as well as monthly fund returns. We select the sample of U.S. mutual funds specializing in the broad Chinese market by filtering with the Lipper class.[3] We manually go through the list of funds to confirm the portfolio coverage.

We apply several filters to the data sample to ensure the quality of the fund returns: (1) We require the latest available TNA (*tna_latest*) to be at least 10 million USD. (2) We require the latest date for the fund (*tna_latest_dt*) to be 2002 or later. (3) We remove funds that do not have fund names. (4) We remove funds that have less than 12 months of observations. (5) We remove funds with duplicated fund keys ($crsp\_fundno$).[4] Our final sample contains 9,984 fund-month observations covering 76 funds. The selected mutual funds have an average TNA of 446 million USD, and an age of 8.9 years.

4.1.2 Empirical Specification

We run a regression of the following form for fund i at date t:

$$Y_{it} = \alpha + \xi_i + \beta \ \Delta log(AH)_t + \text{controls}_{it} + \epsilon_t \ ,$$

where Y is the response variable, ξ_i is a fund fixed effect, $\Delta log(AH)_t$ is the monthly change in mean log A-H premium. Our response variables of interest are (1) fund returns (R_{it}) and (2) fund flows ($Flow_{it}$). Following the prior literature, we compute the monthly fund flow for fund i at date t as the change in fund's monthly TNA beyond the change in monthly fund returns:

$$Flow_{it} = \frac{TNA_{it} - (1 + R_{it})TNA_{it-1}}{TNA_{it-1}} \ .$$

For the regression with fund flow as the response variable, we also include additional controls that may explain fund flows, such as the lagged fund return R_{t-1} and fund age Age.[5] We run the above regression separately on different samples of China-region mutual funds, including (i) active funds who invest in Chinese-related stocks globally, (ii) index funds on broad-China markets, (iii) index funds on Hong Kong and Taiwan markets, (iv) index funds on Mainland Chinese stock markets.[6]

[3] We select the fund if the fund's Lipper Class is in China Region ("CH").

[4] We implement (5) to address the issue of duplicate fund returns. In particular, two funds that have the same fund key will have the same portfolio holdings and returns, though the flows can be different due to different institutional types.

[5] Chevalier and Ellison (1997) find that fund age as well as lagged fund returns have significant explanatory power for equity fund flows. The authors show that the flow-to-performance for the equity fund exhibits a convex relation in the semi-parametric model.

[6] We classify the funds based on the following criterion: (i) The fund is active if the fund is neither an ETF nor index fund. (ii) The fund is Global China passive fund if the fund is index fund and it is not

4.1.3 Results

Table 2 summarizes the results. For active funds and index funds that invest in China-segment stocks in the global market, a positive change in log of the mean A-H premium corresponds to a negative and significant contemporaneous return in NAV. For funds that focus on Mainland Chinese stocks, however, innovations in the A-H premium have insignificant effect on returns. This is consistent with our hypothesis that, A-H premium reflects the China bias from the perspective of *international* investors, who have access to Chinese stocks in the global markets but not in the Mainland Chinese market. The marginal investor for the Mainland Chinese market is not global due to the salient market segmentation and imposed capital controls, and therefore the returns in Mainland-focused indexes are not driven by the change in China bias reflected in the A-H premium.

The table also shows that funds that invest in Chinese stocks in the global market experience negative and contemporaneous fund flows given a positive innovation in logged A-H premium. Since US funds can be invested globally, an outflow indicates that international investors reduce their equilibrium holdings of Chinese-related stocks, which implies that these investors have a higher effective discount rate against Chinese stocks. Index funds that track Mainland Chinese markets have positive yet insignificant fund flows given an increase in A-H premium, despite the fact that these funds are traded by global investors. This suggests that global investors may have a different discount rate Chinese stocks inside versus outside of Mainland China.

4.2 Stocks with Chinese Characteristics

Next, we analyze the stocks that can be traded globally. We test whether the stocks that exhibit more "Chineseness", i.e. have a closer relationship with the Chinese market, will be more sensitive to changes in A-H premium. If the A-H premium is associated with the China bias among global investors, then stocks that have more Chinese characteristics will react more negatively to the positive shift in A-H premium. Based upon our hypothesis, we test with the cross-sectional regression with the following form. For stock j on monthly date t:

$$R_{jt} = \alpha + \gamma_t + \beta_1 \ Chineseness_{jt} + \beta_2 \ \Delta log(AH)_t \times Chineseness_{jt} + \epsilon_t$$

where R_{jt} is the stock return, γ_t is the time fixed effect, $\Delta log(AH)_t$ is the change in mean logged A-H premium, and $Chineseness_{jt}$ measures the degree of connection with China or "Chineseness" of the stock.

region-specific.

4.2.1 The Effect of A-H premium on U.S. Common Stocks

We start by analyzing the differential effect of A-H premium on U.S. common stocks with different degrees of Chinese connection (excluding ADRs). We pick The U.S. stock market because it is sufficiently apart from the Chinese market, and it is highly accessible by global investors. This creates an ideal environment for us to examine the impact of A-H premium as an effective discount rate by global investors on stocks with Chinese characteristics.

We measure the stock-level Chineseness with several proxies. First, we measure the Chineseness with the market beta of U.S. stock returns with respect to A-share market returns. To adjust for infrequent trading as well as the time-zone mismatch against the Chinese stock market, we follow Dimson (1979) to compute the A-share market beta. Specifically, we run the rolling time-series regression of daily U.S. stock returns on contemporaneous, lead-one-day, and lagged-one-day A-share market returns, with a rolling window of 260 days and a minimum of 180 days:

$$R_{jt} = \alpha + \beta_j^{-1} R_{t-1}^{Am} + \beta_j^{0} R_t^{Am} + \beta_j^{+1} R_{t+1}^{Am} + \epsilon_{jt}$$

where R_t^{Am} is the A-share market return. We then compute the market beta as the sum of the beta coefficients: $\beta_j^{Am} = \beta_j^0 + \beta_j^{-1} + \beta_j^{+1}$. A higher Mainland A-share beta β^{Am} corresponds to a higher loading on Mainland Chinese market risk, and thus we expect returns for the firm with higher A-share beta will respond more negatively to the increase in A-H premium.

Second, we proxy with the estimated proportion of revenues coming from Mainland China. Our data source is FactSet Revere, which provides detailed information about the geographic segment of revenues. The U.S. jurisdiction requires the publicly listed firms to disclose information related to the geographic segment, provided that the segment contributes over 10% to the firm's sales, income, or total assets. Nonetheless, the segment information may not be country-specific. Some companies may report the sales revenues at the level of geographic region (for example, East Asia or Southern Europe). To harmonize the data, Factset Revere provides the estimates of country-specific geographic revenues for each firm by re-allocating the revenues from the geographic region to each country based on the country's gross domestic product relative to that region. A higher estimated revenue proportion from China indicates that the firm is more connected with the Chinese market. Therefore, we expect the return of the firm with higher proportional revenue from China to react more negatively to the increase in A-H premium.

Third, we uses the indicator of whether China is mentioned in their public filings as a proxy for Chineseness. Specifically, we collect all 10-K SEC filings for each publicly-listed firm and every year since 2000, and we create an annual indicator marked one if the filing contains the word "China" or "Chinese", and zero otherwise.[7] We find that the U.S. public companies increasingly mention China over the year, from 20% of the listed firms in 2002 to over 50% in 2019. The ratio further spikes to 60% in 2020, and yet starts to decline since then. Firms that mention China in their annual reports are more likely to have connections with China compared to those who do not. As a result, we expect firms with a positive indicator of mentioning China will have a more negative return response with respect to a higher A-H premium.

Lastly, we implement the firm-level measures of country risk and sentiment from Hassan et al. (2021). The authors construct a firm-country-quarter panel that quantifies the sentiment as well as the perception of risk associated with a given country by using the textual analysis of earnings calls from the firm. Our focus is on the sentiment and risk about Mainland China, which is within the coverage of the dataset. A higher value of sentiment on China indicates that the firm assigns more positive tone towards the Chinese market, while a higher value of country risk suggests that the firm perceives an elevated level of risk in China.

Table 3 summarizes the results. Columns (1) through (3) tabulate negative coefficients for the interaction term, which suggests that in the cross-section, stocks that manifest more connections with China have more negative contemporaneous returns given a positive change in A-H premium. The results are consistent with our hypothesis that a higher A-H premium represents a larger bias against Chinese-related stocks among international investors. Column (4) shows that the returns for the firm whose management exhibits more optimism towards its business activities associated with China is more negatively affected by innovations in the A-H premium. The result suggests that the firm manager's sentiment towards China can also affect the return sensitivity of the firm with respect to effective risk aversion on the Chinese market, possibly through the channel of signalling future business engagement with China. Interestingly, column (5) shows that varied levels of perceived risk about China across firms have limited impact on the differential return responses, which suggests that the role of the manager's perceived risk towards Chinese economy may have obscured effect in the firm's return sensitivity with respect to the China bias.

4.2.2 The Effect of A-H Premium on Hong Kong Stocks

Next, we turn to stocks that are traded in Hong Kong stock market. Similar to the market in the U.S., the Hong Kong stock market is also highly accessible to international investors.

[7] As a robustness check, we also create an indicator equals one if the report mentions at least one of the words related to broad Chinese regions (i.e. China, Chinese, Sino, Hong Kong, Taiwan, Macau, Shanghai, Beijing, Shenzhen). The results are similar.

While one unique characteristics of the Hong Kong Stock Exchange (HKSE) is that it hosts a large number of companies which operate their primary businesses in Mainland China. Therefore, Hong Kong stock market is a natural habitat for global investors who want the exposure to China in their portfolio.

We use the HKSE and Wind Financial's classification based on the firm's connection with Mainland China as a measure of Chineseness for Hong Kong companies. The HKSE group the listed companies into different categories with respect to their relationship with Mainland China: (i) For companies that are incorporated in Mainland China, their stocks are classified as "H-shares". The A-H dual-listed stocks are a subset of this category. (ii) For companies that are incorporated outside of Mainland but conduct the majority of business in Mainland and are significantly owned by the Chinese government, their stocks are classified as "red-chips". The Wind Financial platform also provides the classification of Chinese-related stocks, namely "China-concept" stocks, which include firms that have substantial business ties to Mainland China. These classifications provide a clear distinction across different Hong Kong firms in its association with the Chinese market.

We run the following cross-sectional regression for Hong Kong-listed stocks:

$$R_{jt} = \alpha + \gamma_t + \beta_1 \; \mathbb{1}(Chinese)_{jt} + \beta_2 \; \Delta log(AH)_t \times \mathbb{1}(Chinese)_{jt} + \epsilon_t$$

where R_{jt} is the stock return, γ_t is the time fixed effect, $\Delta log(AH)_t$ is the change in mean logged A-H premium, and $\mathbb{1}(Chinese)_{jt}$ is the indicator marked one if the stock is in the Chinese-related category, and zero otherwise. In particular, we indicate whether the listed firms are A-H dual-listed, H-shares, red-chips, or China-concept stocks, and we also test for the firms that fall in any of the four categories.

Table 4 tabulates the regression results. Consistent with our hypothesis, the results show that stocks with closer relation to Mainland China are more sensitive to innovations in A-H premium. In all five specifications, the interaction terms have negative and statistically significant coefficients. The coefficients suggest that stocks that are more connected to Mainland China will have a more negative contemporaneous return given a positive change in logged A-H premium.

The regression results from U.S. and Hong Kong common stocks deliver the same message: Globally traded firms that are more connected with Mainland China are more affected by the changes in A-H premium. The results suggest that the AH premium partially relates to the effective discount rate for Chinese-related stocks from global investors, which we refer to as China bias.

5 Conclusion

This paper presents evidence that the A-H premium reflects the difference in effective discount rates between domestic and foreign investors for Chinese stocks. We provide a simple theoretical framework to link between the A-H premium and discount rate differences, and empirically document that the A-H premium is able to explain the return differentials of the same companies cross-listed in Hong Kong versus Mainland China beyond the traditional return predictors. We further discuss evidence that the A-H premium represents the China bias, i.e. the non-pecuniary disutility from holding Chinese-related assets.

Importantly, the persistently and highly elevated level of A-H premium still remains as a puzzling phenomenon in the financial markets, despite that the official exert substantial efforts in opening up the A-share market. Alongside our insights on the A-H premium, future work can be done in further investigating in the determinants of the A-H premium in relation to China bias. For instance, a higher A-H premium could be associated with less foreign ownership of Chinese stocks and higher ownership concentration, related to the findings from Baker et al. (2022). Also, the A-H premium may provide latent information about the geopolitical sentiment towards China beyond other factors, which could help predict market responses from government decisions.

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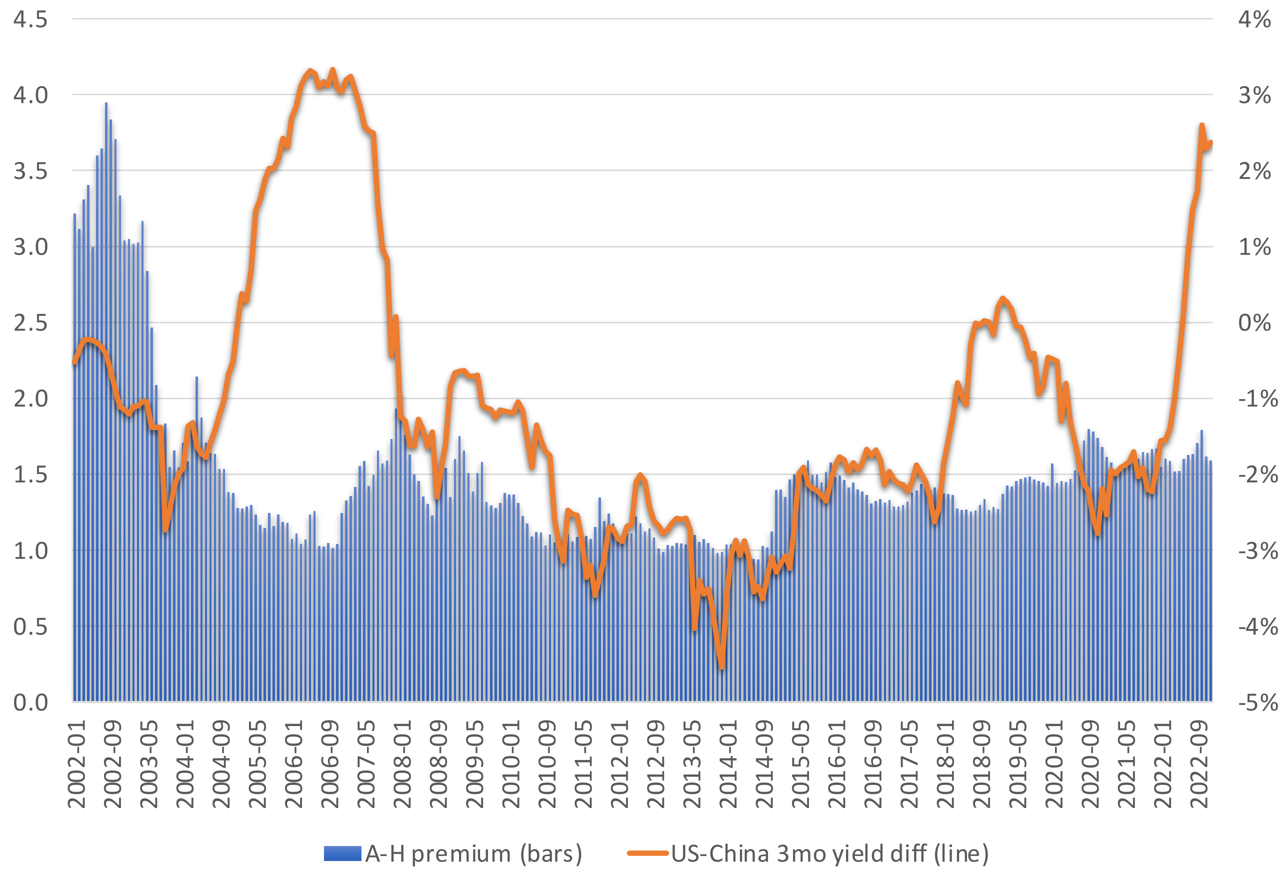
Figure 1: The A-H Premium and the US-China Interest Rate Differential



The value-weighted average A-H premium (left axis) and the US-China three-month government bond yield differential.

Table 1: Cross-Sectional Regressions of A-Share and H-Share Returns and H-A Return Differentials 1/2002–12/2022

Average coefficient estimates from monthly cross-sectional regressions of A-share and H-share returns and H-A return differentials on firm characteristics and their Newey-West t-statistics. Beta (A) is the A-share CAPM beta with respect to the tradable-value-weighted A-share market portfolio estimated from daily returns over the previous 180 to 250 days using the Dimson procedure. Beta (H) is the H-share CAPM beta with respect to the tradable-value-weighted Hong Kong market portfolio estimated from daily returns over the previous 180 to 250 days using the Dimson procedure. Size (tot) is the log of the total firm market capitalization, pricing A shares at their A price and H shares at their H price, denominated in HKD. BM (tot) is the log of the total book equity divided by the total firm market capitalization. Illiq (A) and Illiq (H) are the Amihud illiquidity measures for the A shares and H shares, respectively. Vol (A) and Vol (H) are the volatilities of the daily stock returns over the previous month, in the A- and H-share markets, respectively. Max (A) and Max (H) are the maximum daily returns over the previous month, in the A- and H-share markets, respectively.

Panel A: Dependent variable is A-share return

Spec	log(AH)	Beta (A)	Beta (H)	Size (tot)	BM (tot)	Illiq (A)	Illiq (H)	Vol (A)	Vol (H)	Max (A)	Max (H)	R^2
(1)		0.205	0.334	0.105	0.400	24.305	0.266	-0.033	0.407	-0.122	0.004	0.371
		(0.45)	(1.15)	(1.04)	(2.07)	(2.33)	(1.12)	(-0.12)	(1.57)	(-2.37)	(0.06)	
(2)	-2.454	0.407	0.455	-0.139	0.445	33.305	0.297	0.176	0.391	-0.124	-0.003	0.403
	(-6.09)	(0.84)	(1.32)	(-1.45)	(2.27)	(3.53)	(1.08)	(0.64)	(1.51)	(-2.51)	(-0.05)	
(3)		0.291		0.087	0.318	20.951		0.527		-0.198		0.272
		(0.61)		(0.79)	(1.38)	(2.16)		(2.13)		(-3.99)		
(4)	-2.565	0.561		-0.189	0.348	29.352		0.710		-0.201		0.306
	(-5.91)	(1.09)		(-1.80)	(1.57)	(3.03)		(3.18)		(-4.53)		

Panel B: Dependent variable is H-share return

Spec	log(AH)	Beta (A)	Beta (H)	Size (tot)	BM (tot)	Illiq (A)	Illiq (H)	Vol (A)	Vol (H)	Max (A)	Max (H)	R^2
(5)		-0.114	0.216	-0.021	0.150	13.022	0.266	-0.412	0.810	0.166	-0.166	0.343
		(-0.28)	(0.67)	(-0.20)	(0.61)	(1.49)	(1.05)	(-1.87)	(2.86)	(2.50)	(-2.23)	
(6)	1.204	-0.183	0.110	0.076	0.117	9.431	0.227	-0.497	0.877	0.166	-0.172	0.374
	(3.28)	(-0.47)	(0.31)	(0.67)	(0.45)	(1.10)	(1.00)	(-1.97)	(3.36)	(2.43)	(-2.44)	
(7)			-0.010	-0.091	0.096		0.355		0.567		-0.112	0.237
			(-0.03)	(-0.95)	(0.40)		(1.30)		(2.21)		(-1.56)	
(8)	0.904		-0.073	0.034	0.102		0.250		0.603		-0.113	0.265
	(2.46)		(-0.21)	(0.33)	(0.41)		(1.06)		(2.60)		(-1.78)	

Panel C: Dependent variable is H-share return minus A-share return

Spec	log(AH)	Beta (A)	Beta (H)	Size (tot)	BM (tot)	Illiq (A)	Illiq (H)	Vol (A)	Vol (H)	Max (A)	Max (H)	R^2
(9)		-0.343	-0.134	-0.138	-0.229	-14.432	0.023	-0.336	0.380	0.275	-0.162	0.336
		(-1.12)	(-0.50)	(-1.78)	(-1.41)	(-2.15)	(0.13)	(-1.34)	(1.71)	(4.06)	(-2.68)	
(10)	3.622	-0.623	-0.360	0.203	-0.310	-26.954	-0.051	-0.622	0.457	0.277	-0.160	0.378
	(7.98)	(-2.31)	(-1.13)	(2.36)	(-1.57)	(-3.42)	(-0.25)	(-2.33)	(2.00)	(3.90)	(-2.66)	

Table 2: Contemporaneous Regressions of China Region Mutual Fund Returns and Flows on AH premium 1/2002–12/2022

This table presents the following panel regression for fund i on monthly date t:

$$Y_{it} = \alpha + \xi_i + \beta\ \Delta log(AH)_t + \text{controls}_{it} + \epsilon_t$$

where Y is the response variable, ξ_i is the fund fixed effect, $\Delta log(AH)_t$ is the change in mean logged A-H premium. The response variable includes monthly mutual fund returns R_{it} and monthly fund flows $Flow_{it}$. For fund flows as the response variable, controls include lagged fund return and fund age. The sample of mutual funds are selected from CRSP. A fund is selected if it is under the "China Region Funds" Lipper class, has minimum 10 million USD total net assets, and has more than 12 months of observations. Each and every two columns represent different categorical samples of funds. Columns (1) and (2) present results on active mutual funds invested in Chinese-related stocks. Columns (3) and (4) include passive funds that track indexes on broad China stock markets. Columns (5) and (6) use index funds that track Hong Kong and Taiwan markets. Columns (7) and (8) involve passive funds on Mainland China market indexes. T-statistics are reported in parenthesis. Standard errors are clustered at the month level.

Fund Category	Active		Broad China		HK and TW		Mainland China	
	R_{it}	$Flow_{it}$	R_{it}	$Flow_{it}$	R_{it}	$Flow_{it}$	R_{it}	$Flow_t$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta log(AH)_t$	-0.430	-0.159	-0.542	-0.202	-0.397	-0.338	0.115	1.178
	(-5.79)	(-2.11)	(-4.26)	(-1.92)	(-5.84)	(-3.85)	(0.56)	(1.76)
R_{it-1}		0.375		0.233		-0.015		0.361
		(4.42)		(3.17)		(-0.08)		(2.45)
Age_{it}		-0.003		-0.005		-0.004		-0.011
		(-4.50)		(-4.29)		(-3.98)		(-2.07)
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3865	3839	2218	2174	624	608	700	689
R^2 (within)	0.153	0.012	0.103	0.022	0.145	0.015	0.004	0.054

Table 3: Cross-Sectional Regressions of US Stock Returns on A-H Premium and Stock-Level Measures of Chineseness

Regression coefficient estimates from panel regressions of monthly US stock returns with time fixed effects. For stock j on monthly date t, the regression is of the form:

$$R_{jt} = \alpha + \gamma_t + \beta_1\ Chineseness_{jt} + \beta_2\ \Delta log(AH)_t \times Chineseness_{jt} + \epsilon_t$$

where R_{jt} is the stock return, γ_t is the time fixed effect, $\Delta log(AH)_t$ is the change in mean logged A-H premium, and $Chineseness_{jt}$ is the measure of connection with China or "Chineseness". Each column represents a different specification of Chineseness measure. Column (1) uses the market beta from daily stock returns on A-share market return under the Dimson procedure. Column (2) uses the estimated proportion of sales revenues from Mainland China. Column (3) measures with the indicator marked one if the company mentions "China" or "Chinese" in its SEC filings and zero otherwise. Columns (4) and (5) respectively use the perceived sentiment and risk associated with China, measured with the textual analysis of earnings conference calls by Hassan et al. (2021). T-statistics are reported in parenthesis. Standard errors are clustered at the security level.

			R_{jt}		
	(1)	(2)	(3)	(4)	(5)
$Chineseness_{jt} \times \Delta log(AH)_t$	-0.213	-0.123	-0.050	-2.073	-3.797
	(-3.30)	(-2.71)	(-6.52)	(-1.88)	(-0.41)
$Chineseness_{jt} =$					
A-Share Market Beta	0.002				
	(1.56)				
Revenues from Mainland China		0.003			
		(1.02)			
Mentions China in Filings			0.001		
			(2.03)		
China Sentiment				0.509	
				(7.04)	
China Risk					-0.592
					(-1.02)
Date FE	Yes	Yes	Yes	Yes	Yes
N	383058	905047	774197	277358	277358
R^2 (within)	0.006	0.000	0.002	0.001	0.000

Table 4: Cross-Sectional Regressions of Hong Kong Stock Returns on A-H Premium and Stock-Level Indicatorsio of Chineseness

Regression coefficient estimates from panel regressions of monthly Hong Kong stock returns with time fixed effects. For stock j on monthly date t, the regression is of the form:

$$R_{jt} = \alpha + \gamma_t + \beta_1 \ \mathbb{1}(Chinese)_{jt} + \beta_2 \ \Delta log(AH)_t \times \mathbb{1}(Chinese)_{jt} + \epsilon_t$$

where R_{jt} is the stock return, γ_t is the time fixed effect, $\Delta log(AH)_t$ is the change in mean logged A-H premium, and $\mathbb{1}(Chinese)_{jt}$ is the indicator marked one if the stock is Chinese-related. Each column represents a different classification of Chinese-related stocks. Column (1) uses the indicator marked one if the stock is A and H dual-listed, and zero otherwise. Column (2) uses the indicator of whether the stock is classified as H-share in the Hong Kong Stock Exchange (HKSE). Column (3) uses the indicator of whether the stock is classified as red-chip in the HKSE. Column (4) uses the indicator of whether the stock is classified as "Chinese-Concept" by the Wind Financial. Column (5) uses the indicator marked one if at least one of the criteria from (1) to (4) holds for the stock, and zero otherwise. T-statistics are reported in parenthesis. Standard errors are clustered at the security level.

	R_{jt}				
	(1)	(2)	(3)	(4)	(5)
$\mathbb{1}(Chinese)_{jt} \times \Delta log(AH)_t$	-8.877	-8.459	-6.034	-7.067	-7.308
	(-3.46)	(-3.74)	(-2.42)	(-3.50)	(-3.63)
$\mathbb{1}(Chinese)_{jt} =$					
$\mathbb{1}$*(Dual-listed)*	-1.058				
	(-11.78)				
$\mathbb{1}$*(H-share)*		-1.136			
		(-9.56)			
$\mathbb{1}$*(Red-chip)*			-0.504		
			(-4.07)		
$\mathbb{1}$*(China-concept)*				-0.494	
				(-4.53)	
$\mathbb{1}$*(ANY)*					-0.517
					(-4.70)
Date FE	Yes	Yes	Yes	Yes	Yes
N	200,936	200,936	200,936	200,936	200,936
R-squared (within)	0.001	0.001	0.000	0.002	0.002