Betting Against Others' Beta: Revealed Preferences of Foreign Investors

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Motivation

❑Non-US investors in US equity assets:
- Hold 20% of assets, making them **the third-largest** group (Gabaix & Koijen, 2021).
- Foreign mutual fund USD holdings **quadrupled**, from 5% in 2005 to 21% in 2020 (Du and Huber 2023).
- Hold larger stocks, with an average firm size that is **more than twice** that of US firms ($11B vs $4.6B).

❑ However, the asset pricing implication of foreign investment in the US market is largely **underexplored**!

This Paper

❑ The international market is **partially segmented** due to capital flow restriction and taxation, leading to over-concentration in home portfolios and low diversification.

❑ However, if some investors can **invest abroad** (through mutual funds),
- For the investors from **low home-alpha countries** ($Ret_{cn} = \boldsymbol{\alpha_{cn}} + \beta'_{home} \times World\ MktRet$), the exposure to the world market that is orthogonal to home market risk (world beta) means an opportunity to diversify away from home risk while earning higher world risk premium (higher alpha).
- For investors from **high home-alpha countries**, the negative utility due to domestic concentration can be mitigated by high alpha in the mean-variance framework, and they face a tradeoff between diversification and alpha when investing abroad.

❑ We argue that investors, especially in low home-alpha countries seek diversification, but are constrained by partial segmentation. As a result, funds that allow investors to go abroad to get high world beta are more likely to be "overpriced".

Main Findings

❑ International investor flow:
- Reacts more positively to world premium than to home premium, especially in the low home-alpha countries, indicating a **strong diversification demand** and **alpha-chasing behavior**.

❑ Fund characteristics:
- Funds offering high world beta exhibit low alpha, tilting their portfolio towards stocks with higher world and lower home beta.

❑ Asset pricing implications:
- Among stocks with foreign ownership in the U.S. as well as international regions, a **long-short strategy** on positive world beta spreads yields significantly negative alpha.
  - In the US market, the long-short strategy yields alpha around **-64 basis points (bp) per month, that's almost -8.4% per year!**
  - The alpha for the global sample is around -5% per year.

Data and Methodology

❑ Morningstar Direct and Holding, Datastream, Global Compustat, Compustat, CRSP.

❑Sample period: 2003 Jan to 2019 Dec (limitations in holding subscription).

❑A standard international finance model where local and world markets are not fully integrated:

$$Fund\ Excess\ Ret_{f,t} = \alpha + \beta_{home} \times Sales\ Cntry\ MktRet_{f,t} + \beta_{world} \times World\ MktRet_t$$

❑ We use a revealed preference (Berk and Van Binsbergen (2016) and Barber, Huang, and Odean (2016))to see how flows react to different risk premiums:

$$Fund\ Flow_{f,t+1} = \boldsymbol{\gamma_{alpha}} \times \sum_{t-23}^{t} \alpha_t + \boldsymbol{\gamma_{home}} \times \hat{\beta}_{home_t} \times \sum_{t-23}^{t} SalesCntry\ Mkt_{ft} + \boldsymbol{\gamma_{world}} \times \hat{\beta}_{world_t} \times \sum_{t-23}^{t} World\ Mkt_t$$

Where $Fund\ Flow_{f,t+1} = \frac{Fund\ Flow_{f,t+1}}{Fund\ Size_{f,t-1}}$. $SalesCntry\ Mkt_{ft}$ is the country market value weighted home market return for the countries that the fund is selling to and $World\ Mkt_t$ is the world market return from MSCI.

The Revealed Preference Results

Fund $Flow_{t+1}$	(1)	(2)	(3)	(4)
	Full Sample			
(Beta Home × Home MKT)$_t$	0.103***	0.095***	0.110***	0.123***
	(6.45)	(4.40)	(5.98)	(7.93)
(Beta World × World MKT)$_t$	0.207***	0.329***	0.211***	0.239***
	(9.54)	(10.79)	(8.95)	(10.43)
Two Factor Alpha$_t$	0.850***	1.838***	0.929***	0.829***
	(11.07)	(16.64)	(11.14)	(12.07)
(Beta Home × Home MKT × High α_{cn})$_t$	0.006	0.107***	0.045*	-0.022
	(0.33)	(3.31)	(1.94)	(-1.30)
(Beta World × World MKT × High α_{cn})$_t$	-0.102***	-0.187***	-0.088***	-0.122***
	(-4.74)	(-5.70)	(-3.61)	(-5.68)
(Two Factor Alpha × High α_{cn})$_t$	-0.039	-0.032	-0.028	-0.072*
	(-0.83)	(-0.47)	(-0.58)	(-1.76)
High $\boldsymbol{\alpha_{cn_t}}$	-0.023	0.128**	0.140***	0.021
	(-0.76)	(2.32)	(2.68)	(0.63)
Controls	YES	YES	YES	YES
Date FE	YES	NO	NO	YES
Fund FE	NO	NO	NO	YES
Cate x Date	NO	YES	NO	NO
Domicile x Date	NO	NO	YES	NO
Diff Prob	0.000	0.000	0.000	0.000
Observations	1,865,207	1,857,093	1,864,390	1,864,972
Adjusted R-squared	0.104	0.092	0.110	0.156

➢ Controls include age, fund size, fund family size, fund return ivol, expense ratio, and Morningstar Category average flows.

➢ $\boldsymbol{\alpha_{cn}}$ is calculated using the regression of country return on world market and aggregate to the fund level.

➢ "Diff Prob" the p-value of the difference in the estimates of the world risk premium coefficient and the home risk premium.

➢ For investors located in low α_{cn} countries, their flow respond more positively to the world risk premiums compared to the response to the home risk premium, an indication of diversification demand and alpha-chasing behavior. For investors located in high $\boldsymbol{\alpha_{cn}}$ countries, their flows react to the world and home risk premiums equally.

➢ One example of high α_{cn} is the funds selling to the US investors.

➢ In unreported results, investors from α_{cn} countries seem to prefer funds with high world beta, which tend to exhibit lower two-factor alpha. This suggests that fund managers providing diversification may not be putting significant effort into seeking the "true" alpha.

Constructing 'The Others' Beta': Stock Level World Beta (β_2)

❑We construct the **world beta from the perspective of foreign investor**. This beta is not perceived by the domestic investors and is referred as "others' beta".

❑Using Morningstar Holding, we perform the following steps:
- for each stock held by a foreign fund, run a 60-month rolling regression to get fund-stock home beta (β_1) and world beta (β_2):

$$ret_{st} = \beta_{1_{sft}} \times SalesCntry\ MKT_{ft} + \boldsymbol{\beta_{2_{sft}}} \times World\ MKT_t + \epsilon_{\text{sft}}$$

Where ret_{st} is the stock return held by a fund.
- Aggregate across funds $\beta_{2_{sft}}$ to get stock level world beta $\beta_{2_{st}}$:

$$Holding\ Weight\ World\ Beta\ \left(\beta_{2_{sft}}\right) = \frac{\sum_{f=1}^{F} Holding_{sft} \times \beta_{2_{sft}}}{\sum_{f=1}^{F} Holding_{sft}},$$

Do the same for home beta $\beta_{1_{sft}}$ to get the stock level home beta $\beta_{1_{st}}$

Betting Against Others' Beta: US Market Evidence

❑ Table below shows the single sort results using world beta ($\beta_{2_{st}}$) for US stocks held by foreign investors.

	Holding Weighted β_2 (Ret or Alpha in %)											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	β_2 (World)	β_1 (Home)	# of Stock	α (USMK)	α (World MK)	α (USMK+ WorldMK)	α (USMK+ WorldFF3)	α (USFF3+ WorldFF3)	α (USMK+ WorldC4)	α (USC4+ WorldC4)	α (USMK + WorldFF5	α (USFF5 + WorldFF5)
Q1 (low β_2)	0.12	0.49	197	0.28**	0.38***	0.30***	0.38***	0.38***	0.32***	0.29**	0.43***	0.40***
				(2.57)	(3.35)	(2.84)	(3.74)	(3.66)	(2.96)	(2.50)	(3.63)	(3.43)
Q2	0.83	-0.02	198	0.13	0.27**	0.12	0.13	0.07	0.17*	0.05	0.03	-0.02
				(1.36)	(2.16)	(1.26)	(1.44)	(0.75)	(1.70)	(0.50)	(0.30)	(-0.15)
Q3	1.23	-0.18	198	-0.00	0.17	-0.01	-0.00	-0.06	0.14	0.12	-0.15	-0.17*
				(-0.00)	(1.26)	(-0.12)	(-0.04)	(-0.58)	(1.48)	(1.18)	(-1.36)	(-1.67)
Q4	1.70	-0.34	198	-0.04	0.16	-0.04	-0.06	-0.08	0.04	0.05	-0.09	-0.08
				(-0.32)	(1.04)	(-0.37)	(-0.50)	(-0.73)	(0.38)	(0.38)	(-0.68)	(-0.61)
Q5 (high β_2)	2.93	-0.90	198	-0.41**	-0.17	-0.41**	-0.45***	-0.48***	-0.16	-0.06	-0.25	-0.18
				(-2.31)	(-0.76)	(-2.29)	(-2.72)	(-2.89)	(-0.99)	(-0.33)	(-1.33)	(-0.95)
Q5-Q1				**-0.69*** **	**-0.55** **	**-0.71*** **	**-0.82*** **	**-0.86*** **	**-0.48** **	**-0.35**	**-0.68*** **	**-0.58** **
				(-3.03)	(-2.27)	(-3.12)	(-3.93)	(-4.05)	(-2.26)	(-1.52)	(-2.79)	(-2.41)

➢ The higher the world beta (β_2) the lower the alpha and the long-short portfolio alpha remains negative across different factor models, indicating that the diversification demand and chasing-alpha behavior from foreign investors can distort market efficiencies in the US market!

➢ In the unreported table, the betting against others beta phenomenon is not driven by the US betting against beta.

Betting Against Others' Beta: International Evidence

❑ Table below shows the single sort results using world beta ($\beta_{2_{st}}$) for international stocks (excluding the US market) held by foreign investors.

		Holding Weighted $\boldsymbol{\beta_2}$ (Ret or α in %)											
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Region (EX US)		β_2 (World)	β_1 (Home)	#of Stock	α (RegMK)	α (WorldMK)	α (RegMK+ WorldMK)	α (Reg MK + WorldFF3)	α (Reg FF3+ WorldFF3)	α (Reg MK + World C4)	α (Reg C4+ WorldC4)	α Reg MK + World FF5	α RegFF5+ WorldFF5
Developed	R1 (low β_2)	-0.17	0.80	83	0.14*	0.07	0.17**	0.23***	0.24***	0.22***	0.21**	0.27***	0.25***
					(1.67)	(0.56)	(1.99)	(2.99)	(2.99)	(2.61)	(2.43)	(3.00)	(2.64)
	R2	0.53	0.26	83	0.13**	0.06	0.14**	0.20***	0.22***	0.18***	0.20***	0.10	0.12*
					(2.00)	(0.62)	(2.20)	(3.52)	(3.91)	(2.96)	(3.25)	(1.46)	(1.80)
	R3	0.90	0.08	81	0.03	-0.05	0.02	0.03	0.04	0.02	0.01	0.03	0.05
					(0.65)	(-0.55)	(0.49)	(0.70)	(0.92)	(0.46)	(0.20)	(0.53)	(0.88)
	R4	1.35	-0.14	83	-0.04	-0.14	-0.06	-0.08	-0.08	-0.05	-0.05	-0.01	-0.01
					(-0.58)	(-1.26)	(-0.77)	(-1.06)	(-1.03)	(-0.58)	(-0.57)	(-0.07)	(-0.08)
	R5 (high β_2)	2.49	-0.83	83	-0.21*	-0.34**	-0.25**	-0.33***	-0.33***	-0.23**	-0.22**	-0.15	-0.17
					(-1.82)	(-2.51)	(-2.26)	(-3.20)	(-3.18)	(-2.06)	(-1.97)	(-1.29)	(-1.38)
	R5-R1				**-0.35** **	**-0.41** **	**-0.42*** **	**-0.57*** **	**-0.57*** **	**-0.44*** **	**-0.43*** **	**-0.43** **	**-0.42** **
					(-2.11)	(-2.55)	(-2.61)	(-3.94)	(-3.93)	(-2.91)	(-2.75)	(-2.56)	(-2.40)
G18	R1 (low β_2)	-0.18	0.82	95	0.07	0.03	0.08	0.14	0.16*	0.11	0.12	0.20*	0.19*
					(0.76)	(0.26)	(0.82)	(1.55)	(1.75)	(1.16)	(1.20)	(1.84)	(1.76)
	R2	0.57	0.25	95	0.09	0.03	0.09	0.14*	0.19***	0.13*	0.17**	0.03	0.06
					(1.24)	(0.50)	(1.17)	(1.95)	(2.70)	(1.69)	(2.17)	(0.40)	(0.67)
	R3	0.97	0.04	95	-0.06	-0.11	-0.08	-0.08	-0.05	-0.09	-0.06	-0.09	-0.04
					(-0.86)	(-1.00)	(-1.14)	(-1.15)	(-0.72)	(-1.28)	(-0.76)	(-1.15)	(-0.52)
	R4	1.41	-0.20	95	-0.17*	-0.22*	-0.18**	-0.21**	-0.21**	-0.20**	-0.20**	-0.15	-0.10
					(-1.89)	(-1.67)	(-2.05)	(-2.46)	(-2.39)	(-2.18)	(-1.99)	(-1.47)	(-1.00)
	R5 (high β_2)	2.64	-0.98	95	-0.33***	-0.41***	-0.36***	-0.43***	-0.43***	-0.37***	-0.36***	-0.21	-0.22
					(-2.76)	(-2.62)	(-3.06)	(-3.74)	(-3.65)	(-3.01)	(-2.79)	(-1.59)	(-1.58)
	R5-R1				**-0.40** **	**-0.44*** **	**-0.44*** **	**-0.57*** **	**-0.59*** **	**-0.48*** **	**-0.48*** **	**-0.40** **	**-0.41** **
					(-2.51)	(-2.80)	(-2.78)	(-3.90)	(-3.97)	(-3.09)	(-2.94)	(-2.39)	(-2.34)
World	R1 (low β_2)	-0.15	0.81	71	0.07	0.04	0.07	0.13*	0.14*	0.10	0.10	0.18**	0.16*
					(0.82)	(0.30)	(0.94)	(1.75)	(1.84)	(1.19)	(1.14)	(2.05)	(1.71)
	R2	0.56	0.28	71	0.07	0.05	0.07	0.12**	0.15***	0.10	0.12*	0.04	0.05
					(1.14)	(0.51)	(1.18)	(2.13)	(2.66)	(1.56)	(1.92)	(0.53)	(0.78)
	R3	0.94	0.08	70	-0.01	-0.04	-0.02	-0.02	0.00	-0.03	-0.02	-0.04	0.01
					(-0.23)	(-0.39)	(-0.40)	(-0.40)	(0.04)	(-0.52)	(-0.34)	(-0.61)	(0.08)
	R4	1.39	-0.15	71	-0.11	-0.14	-0.12*	-0.14**	-0.14**	-0.13*	-0.13	-0.09	-0.06
					(-1.54)	(-1.22)	(-1.72)	(-2.07)	(-2.03)	(-1.74)	(-1.63)	(-1.17)	(-0.71)
	R5 (high β_2)	2.47	-0.82	71	-0.24**	-0.30**	-0.27***	-0.33***	-0.33***	-0.26***	-0.25**	-0.16	-0.17
					(-2.45)	(-2.20)	(-2.73)	(-3.59)	(-3.54)	(-2.63)	(-2.37)	(-1.55)	(-1.49)
	R5-R1				**-0.31** **	**-0.34** **	**-0.34** **	**-0.46*** **	**-0.47*** **	**-0.35*** **	**-0.35** **	**-0.35** **	**-0.33** **
					(-2.18)	(-2.47)	(-2.45)	(-3.67)	(-3.69)	(-2.64)	(-2.42)	(-2.36)	(-2.10)

➢ The market efficiency distortions coming from diversification demand and alpha-chasing behavior of international investors are prevalent worldwide!

Conclusion

❑ We document that international investors react more positively to world risk premium compared to that of the home risk premium, an indication of diversification demand and alpha-chasing behavior.

❑ Funds with heightened exposure to international beta consistently exhibit lower alpha, tilting their portfolio towards stocks with a higher international and lower home beta.

❑ Among foreign-held stocks in global markets, a long-short strategy formed on positive international beta spreads yields significantly negative alpha across different asset pricing models.