Online Appendix for

SPAC IPOs and Sponsor Network Centrality

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A Appendix: Case

A.1 Gores Holdings II, Inc. and Verra Mobility

The Gores Group was founded in 1987 by Alex Gores as a global investment firm focused on acquiring businesses that can benefit from the firm's operating expertise. The Gores Group is highly experienced in acquiring and selling subsidiaries of publicly traded firms. Over its 30-year history, the Gores Group has acquired more than 100 businesses, including a current portfolio of more than 20 active companies worldwide. Although Gores is a generalist investment fund, it has a particular interest in technology, telecommunications, business services, and industrial companies. For example, in 1997, it acquired the information technology company Artemis International Solutions Corp., a subsidiary of the NYSE traded firm Computer Sciences Corporation. In 2001, Gores acquired VeriFone, a producer of electronic payment systems, from Hewlett Packard. In 2011, Gores sold Lineage Power for $520 million to General Electric. In 2013, Gores' portfolio firm, Stock Building Supply, now called Building Materials Holding Corporation, went public.

The Gores Group has launched nine SPACs, from Gores Holdings I, Inc. to Gores Holding IX, Inc., since 2015. Its latest SPAC, Gores Holdings IX, went public in January 2022 and raised $525 million.

One of the Gores Group's most successful SPACs is Gores Holdings II, Inc. (GSHT). It merged with Verra Mobility, the leading provider of tech-enabled smart transportation solutions throughout the United States, Canada, and Europe. Gores launched GSHT on January 12, 2017, and offered 40 million units, which included 25 million units issued pursuant to the partial exercise by the underwriter of its over-allotment option, at an offer price of $10, thus raising $400 million in cash proceeds. Deutsche Bank Securities Inc. served as the underwriter for this offering. GSHT was supposed to complete a business combination within 24 months from the IPO's first trading day.

Each unit of GSHT consisted of one share of Class A common stock and one-third of one warrant. Each whole warrant entitled the holder to buy one Class A common share at the strike price of $11.5 upon the completion of the business combination. These warrants were exercisable on the later of 30 days after the completion of the initial business combination or 12 months from the IPO. GSHT's common shares and warrants began separate trading on March 24, 2017, and the closing prices of the common share and warrant on that day were $10 and $11.29, respectively.

On June 21, 2018, nearly one and a half years after its IPO, GSHT announced its merger agreement with Verra Mobility. This business proposal was approved at a special meeting of GSHT's stockholders on October 16, 2018, and holders of less than 1% of the outstanding shares elected to exercise their redemption rights (1% is very low considering that the average redemption ratio of SPACs is 55.1% in our sample). Verra Mobility was valued at $2.4 billion, and the business combination was then completed on October 17, 2018.

The considerable payables to Verra Mobility's shareholders consisted of cash and common shares of GSHT. Besides the $400 million cash held in GSHT's trust account, GSHT had attracted some top-tier institutional investors, such as GIC Private Limited, Hamilton Lane, and Northwestern Mutual, to fund the deal through a $400 million private placement.

The announcement return of GSHT was 0.89%, which outperformed the market by 1.53% that day. Six months after the business combination, it earned a raw return of 24.93%, outperforming the market by 21.41%. One year after the business combination, it earned a raw return of 36.06%, outperforming the market by 29.76%. Two years after the business combination, on average, it earned a Fama-French three-factor monthly alpha of 2.65%.

GSHT's high-quality PIPE investment and superior post-M&A long-term performance have outperformed those of many SPACs in the market. And we might gain some insights from the network centrality of its founders. The average network centrality of GSHT ranks in the top 15 across all SPACs in our sample. Seven members served in the management team of GSHT. Alec Gores was the chairman of GSHT, and he has been the founder, chairman, and chief executive officer of the Gores Group since 1987. His profound experience in private equity investment makes him one of the top 20 most connected SPAC sponsors in our sample (and top 1% in the entire PE network) with regard to the betweenness centrality. Some other members also have a high PE network centrality rank in our sample. Mark R. Stone was the chief executive officer of GSHT; he is also the senior managing director, a member of the investment committee, and a member of the office of the chairman of the Gores Group. Andrew McBride was the president of GSHT; he is also the chief financial officer and secretary of the Gores Group. Dominick J. Schiano was the president of GSHT; he is also the president and co-founding partner of Evergreen Capital Partners LLC. Mr. Schiano has also served on the board of investment of firms such as the DLJ Merchant Banking Partners, Great Range Capital, Closed Loop Partners, and Questor Partners Funds. In the management team of GSHT, Dominick Schiano played an important role in sourcing investment opportunities and providing strategic, operational, and financial guidance to portfolio companies.

We observe that not all the members of GSHT were from the sponsor-affiliated private equity firm, the Gores Group, and the key person in charge of deal sourcing, Dominick Schiano, was actually from another firm and was not in the role of CEO of GSHT. This typical kind of SPAC management team structure justifies why we compute the network centrality at the team level instead of just using CEO network centrality.

Table OA1: PE network centrality on the post-M&A long-term performance (control for dilution)

This table presents the results of SPAC sponsors' PE network centrality on the post-M&A long-term performance of SPACs after controlling for dilution. The dependent variable FF_alpha is the monthly Fama-French three-factor alpha (in percent) measured over a 24-month period after the M&A completion date. Dilution is the number of warrants and rights contained in one unit of the SPAC. SPAC sponsors' PE network centrality is measured by *degree*, *closeness*, *betweenness*, *eigenvector*, and the first component score of the four measures (*Net_Aggregate*) one year before the SPAC IPO, aggregated at the firm level. Other variable definitions are given in Appendix Table A1. Heteroskedasticity-consistent standard errors clustered at the SPAC issuance year level are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
VARIABLES	FF_alpha	FF_alpha	FF_alpha	FF_alpha	FF_alpha
PE Net_Aggregate	0.495***				
	[0.168]				
PE Degree		8.104**			
		[2.986]			
PE Closeness			8.444***		
			[2.491]		
PE Eigenvector				7.923***	
				[2.337]	
PE Betweenness					7.468**
					[3.283]
Dilution	-3.317	-3.330	-3.354	-3.381	-3.260
	[2.787]	[2.803]	[2.799]	[2.783]	[2.760]
Team Size	0.167	0.168	0.168	0.172	0.151
	[0.146]	[0.148]	[0.145]	[0.147]	[0.144]
Team Age	-0.057	-0.055	-0.060	-0.056	-0.049
	[0.126]	[0.125]	[0.126]	[0.124]	[0.126]
LnSize	1.377	1.389	1.331	1.363	1.576*
	[0.896]	[0.887]	[0.908]	[0.914]	[0.879]
Lead Bank Rank	0.119	0.119	0.127	0.126	0.103
	[0.224]	[0.224]	[0.227]	[0.226]	[0.219]
Constant	-25.640	-25.892	-25.642	-25.952	-28.704*
	[15.047]	[14.951]	[15.076]	[15.107]	[14.975]
IPO year FE	Yes	Yes	Yes	Yes	Yes
Observations	356	356	356	356	356
Adjusted R^2	0.150	0.149	0.150	0.150	0.148

Table OA2: PE network and post-merger long-term performance of the combined company (control for industry fixed effects and SPAC sponsors' seats on the new board)

This table presents the results of cross-sectional regressions of SPAC sponsors' PE network centrality on the post M&A long-term performance of SPACs. The dependent variable FF_alpha is the monthly Fama-French three-factor alpha (in percent) measured over a 24-month period after the M&A completion date. Board SPAC pct is the percentage of board members of the combined firm that come from the management team of the SPAC. SPAC sponsors' PE network centrality is measured by *degree*, *closeness*, *betweenness*, *eigenvector*, and the first component score of the four measures (*Net_Aggregate*) one year before the SPAC IPO, aggregated at the firm level. Other variable definitions are presented in Appendix Table A1. Heteroskedasticity-consistent standard errors clustered at the SPAC issuance year level are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	(1) FF_alpha	(2) FF_alpha	(3) FF_alpha	(4) FF_alpha	(5) FF_alpha
PE Net_Aggregate	0.522***				
	[0.164]				
PE Degree		8.487**			
		[2.953]			
PE Closeness			8.998***		
			[2.479]		
PE Eigenvector				8.362***	
				[2.190]	
PE Betweenness					7.872**
					[3.262]
Team Size	0.138	0.141	0.138	0.143	0.123
	[0.136]	[0.137]	[0.135]	[0.137]	[0.134]
Team Age	-0.092	-0.088	-0.095	-0.091	-0.081
	[0.124]	[0.123]	[0.124]	[0.122]	[0.123]
LnSize	1.604**	1.624**	1.563**	1.601**	1.803**
	[0.727]	[0.727]	[0.734]	[0.749]	[0.717]
Lead Bank Rank	0.171	0.170	0.180	0.180	0.153
	[0.231]	[0.230]	[0.233]	[0.232]	[0.227]
Board SPAC pct	4.552**	4.530**	4.600**	4.617**	4.496*
	[2.092]	[2.108]	[2.048]	[2.036]	[2.141]
Constant	-32.766**	-33.187**	-32.972***	-33.408***	-35.826***
	[11.502]	[11.604]	[11.355]	[11.486]	[11.590]
IPO year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Observations	356	356	356	356	356
Adjusted R^2	0.145	0.144	0.145	0.145	0.143

Table OA3: Cross-sectional regression of PE network centrality on redemption threshold

This table presents the results of cross-sectional regression of SPAC sponsors' PE network centrality on the redemption threshold of SPACs. The dependent variable redemption threshold is the maximum percentage of shares that SPAC shareholders can redeem upon the completion of the business combination while the business combination can still be completed. If the percentage of investors who withdraw their investment exceeds this threshold, the SPAC sponsors have to return all the IPO proceeds back to the investors from the trust account. SPAC sponsors' PE network centrality is measured by *degree*, *closeness*, *betweenness*, *eigenvector*, and the first component score of the four measures (*Net_Aggregate*) one year before the SPAC IPO, aggregated at the firm level. Variable definitions are given in Appendix Table A1. Heteroskedasticity-consistent standard errors clustered at the SPAC issuance year level are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	(1) Redemption Threshold	(2) Redemption Threshold	(3) Redemption Threshold	(4) Redemption Threshold	(5) Redemption Threshold
PE Net_Aggregate	0.052				
	[0.066]				
PE Degree		0.903			
		[1.152]			
PE Closeness			1.063		
			[1.014]		
PE Eigenvector				0.843	
				[1.114]	
PE Betweenness					0.290
					[0.805]
Team Size	0.005	0.006	0.006	0.006	0.005
	[0.020]	[0.020]	[0.020]	[0.020]	[0.020]
Team Age	0.021	0.021	0.020	0.021	0.022
	[0.016]	[0.016]	[0.016]	[0.016]	[0.016]
LnSize	2.586***	2.582***	2.577***	2.593***	2.613***
	[0.300]	[0.303]	[0.299]	[0.293]	[0.293]
Lead Bank Rank	0.056*	0.056*	0.056*	0.057*	0.058*
	[0.029]	[0.029]	[0.030]	[0.030]	[0.030]
Constant	-25.604***	-25.541***	-25.644***	-25.799***	-25.837***
	[5.146]	[5.166]	[5.110]	[5.070]	[5.110]
IPO year FE	Yes	Yes	Yes	Yes	Yes
Observations	1,306	1,306	1,306	1,306	1,306
Adjusted R^2	0.991	0.991	0.991	0.991	0.991

Table OA4: Cross-sectional regression of PE network centrality and a simple PE experience dummy on SPAC performance.

This table presents the results of SPAC sponsors' PE network centrality and a simple PE experience dummy on the IPO deal size and post-merger long-term performance of SPACs. The dependent variable in columns (1) and (2) is the IPO deal size in $millions of SPAC IPOs. In columns (3) and (4), the dependent variable PIPE investment raised by the SPAC during the business combination. SPAC sponsors' PE network centrality is measured by the first component of the four centrality measures (*degree*, *closeness*, *betweenness*, and *eigenvector*) 1 year before the SPAC IPO and aggregated at the firm level. If_PE is a dummy that equals one if the sponsor team has any PE/VC work experience as top executives or board members. Variable definitions are given in Appendix Table A1. Heteroskedasticity-consistent standard errors clustered at the SPAC issuance year level are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	(1) IPO Size	(2) IPO Size	(3) PIPE	(4) PIPE
If_PE	54.367***	15.915	48.626	4.912
	[14.528]	[11.423]	[32.130]	[31.005]
PE Net_Aggregate		15.791***		14.865***
		[2.697]		[3.197]
Team Size	4.111**	5.191***	2.822	4.009
	[1.437]	[1.564]	[2.903]	[2.900]
Team Age	0.896	0.540	-0.393	-0.798
	[0.703]	[0.680]	[1.160]	[1.145]
Lead Bank Rank	19.215***	18.650***	16.692***	16.250***
	[3.612]	[3.588]	[3.424]	[3.338]
Constant	-119.948**	-192.453***	-57.543	-115.299
	[52.568]	[40.185]	[97.241]	[94.552]
IPO year FE	Yes	Yes	Yes	Yes
Observations	1,306	1,306	580	580
Adjusted R^2	0.209	0.219	0.135	0.140

Table OA5: PE network centrality on the post-M&A long-term performance (unit return)

This table presents the results of SPAC sponsors' PE network centrality on the post-M&A long-term performance of SPACs. The dependent variable, FF_alpha, is the monthly Fama-French three-factor alpha measured over 24 months after the SPAC M&A completion date using the unit return of SPACs. The unit return for the pre-2009 period is proxied by the common share return. SPAC sponsors' PE network centrality is measured by *degree*, *closeness*, *betweenness*, *eigenvector*, and the first component score of the four measures (*Net_Aggregate*) one year before the SPAC IPO, aggregated at the firm level. Variable definitions are given in Appendix Table A1. Heteroskedasticity-consistent standard errors clustered at the SPAC issuance year level are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	(1) FF_alpha	(2) FF_alpha	(3) FF_alpha	(4) FF_alpha	(5) FF_alpha
PE Net_Aggregate	0.337**				
	[0.130]				
PE Degree		5.218**			
		[2.306]			
PE Closeness			6.155***		
			[2.073]		
PE Eigenvector				5.616***	
				[1.928]	
PE Betweenness					4.719*
					[2.411]
Team Size	0.197**	0.196**	0.199**	0.201**	0.185**
	[0.074]	[0.075]	[0.074]	[0.076]	[0.071]
Team Age	-0.049	-0.046	-0.053	-0.049	-0.042
	[0.039]	[0.038]	[0.040]	[0.038]	[0.039]
LnSize	1.059*	1.088*	1.006	1.042*	1.206*
	[0.595]	[0.608]	[0.588]	[0.592]	[0.577]
Lead Bank Rank	0.129	0.128	0.135	0.134	0.118
	[0.136]	[0.136]	[0.137]	[0.138]	[0.133]
Constant	-27.062**	-27.487**	-26.884**	-27.302**	-29.154***
	[9.985]	[10.099]	[9.786]	[9.810]	[9.884]
IPO year FE	Yes	Yes	Yes	Yes	Yes
Observations	356	356	356	356	356
Adjusted R^2	0.120	0.118	0.121	0.121	0.116

Table OA6: PE network centrality on the post-M&A long-term performance (unit return, subsample after 2009)

This table presents the results of SPAC sponsors' PE network centrality on the post-M&A long-term performance of SPACs for the subsample after 2009. The dependent variable, FF_alpha, is the monthly Fama-French three-factor alpha measured over 24 months after the SPAC M&A completion date using the unit return of SPACs. SPAC sponsors' PE network centrality is measured by *degree*, *closeness*, *betweenness*, *eigenvector*, and the first component score of the four measures (*Net_Aggregate*) one year before the SPAC IPO, aggregated at the firm level. Variable definitions are given in Appendix Table A1. Heteroskedasticity-consistent standard errors clustered at the SPAC issuance year level are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	(1) FF_alpha	(2) FF_alpha	(3) FF_alpha	(4) FF_alpha	(5) FF_alpha
PE Net_Aggregate	0.344**				
	[0.135]				
PE Degree		5.434**			
		[2.337]			
PE Closeness			6.155**		
			[2.164]		
PE Eigenvector				5.500**	
				[2.023]	
PE Betweenness					5.472*
					[2.553]
Team Size	0.171*	0.172*	0.169*	0.173*	0.166*
	[0.081]	[0.081]	[0.080]	[0.083]	[0.077]
Team Age	-0.058	-0.054	-0.062	-0.058	-0.053
	[0.037]	[0.035]	[0.038]	[0.036]	[0.037]
LnSize	0.606	0.642	0.573	0.614	0.694
	[0.677]	[0.678]	[0.665]	[0.682]	[0.664]
Lead Bank Rank	0.211	0.209	0.214	0.216	0.208
	[0.182]	[0.179]	[0.184]	[0.185]	[0.178]
Constant	-12.693	-13.677	-12.208	-13.323	-14.954
	[11.445]	[11.419]	[11.161]	[11.314]	[11.196]
IPO year FE	Yes	Yes	Yes	Yes	Yes
Observations	276	276	276	276	276
Adjusted R^2	0.080	0.078	0.080	0.079	0.078

Table OA7: PE network centrality and SPAC performance (regression without controls)

This table presents the results of cross-sectional regressions of SPAC sponsors' PE network centrality on IPO proceeds, PIPE investment, M&A completion, M&A size, and merger target profitability of SPACs. The dependent variable in column (1) is the SPAC IPO proceeds in millions. The dependent variable in column (2) is the PIPE investment raised by the SPAC during the business combination. Column (3) presents the regression results using the Cox proportional-hazards model, where M&A completion is defined as the "hazard event.", and the time from SPAC IPO's first trading day to the M&A effective date is the survival time. The dependent variable in column (4) is the total revenue of the target firm disclosed before the business combination. SPAC sponsors' PE network centrality is measured by the first component of the four centrality measures (*degree*, *closeness*, *betweenness*, and *eigenvector*) 1 year before the SPAC IPO and aggregated at the firm level. Variable definitions are given in Appendix Table A1. Heteroskedasticity-consistent standard errors are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
VARIABLES	IPO Size	PIPE	M&A Completion	*Revenue_bf*
PE Net_Aggregate	27.009***	23.322***	0.070***	59.771***
	[4.017]	[6.471]	[0.017]	[18.834]
Constant	249.383***	142.570***		223.986***
	[5.729]	[11.750]		[24.385]
IPO year FE	No	No	No	No
Observations	1,306	580	580	378
Adjusted R^2	0.055	0.027		0.061