Internet Appendix for:
"Private Equity Performance and Liquidity Risk"[1]

This internet appendix provides three extensions to the main article: (I) Explicit derivations for alpha and beta in our return equations; (II) a conditional analysis of the liquidity risk premium; and (III) a discussion of the relation between liquidity risk and liquidity level.

I. Derivation of the Expressions for Alpha and Beta

In this appendix, we provide the explicit derivation of equations (6) and (7) in the text. The reported formulas differ slightly from the formulas in Cochrane (2005), because we have a multifactor model and the factors are not in logarithmic form.

From equation (2), R^i_{t+1} is the exponential of a normally distributed variable:

$$R^i_{t+1} = R^f_{t+1} e^{\gamma + \delta' f_{t+1} + \varepsilon^i_{t+1}}.$$

Also, by assumption, the factors are normal. Hence, the expression of the expected return is

$$E\left(R^i_{t+1}\right) = R^f_{t+1} e^{\gamma + \delta' \mu_F + \frac{1}{2}\delta' \sigma^2_F \delta + \frac{1}{2}\sigma^2}. \tag{IA.1}$$

Applying Stein's lemma, the covariance can be expressed as

$$\begin{aligned} Cov\left(f_{t+1}, R^i_{t+1}\right) &= Cov(f_{t+1}, \delta' f_{t+1} + \varepsilon^i_{t+1}) E\left(R^i_{t+1}\right) \\ &= Cov\left(f_{t+1}, \delta' f_{t+1} + \varepsilon^i_{t+1}\right) R^f_{t+1} e^{\gamma + \delta' \mu_F + \frac{1}{2}\delta' \sigma^2_F \delta + \frac{1}{2}\sigma^2} \\ &= Var\left(f_{t+1}\right) \delta R^f_{t+1} e^{\gamma + \delta' \mu_F + \frac{1}{2}\delta' \sigma^2_F \delta + \frac{1}{2}\sigma^2}, \end{aligned}$$

where, for the last step, we use the fact that ε^i_{t+1} and f_{t+1} are uncorrelated. The expression for beta then follows:

[1]Citation format: Francesco Franzoni, Eric Nowak, and Ludovic Phalippou, [year], Internet Appendix for "Private Equity Performance and Liquidity Risk," *Journal of Finance* [vol], [pages], http://www.afajof.org/supplements.asp. Please note: Wiley-Blackwell is not responsible for the content or functionality of any supporting information supplied by the authors. Any queries (other than missing material) should be directed to the authors of the article.

$$\begin{aligned}\beta &= Var\left(f_{t+1}\right)^{-1} Cov\left(f_{t+1}, R_{t+1}^{i}\right) \\ &= Var\left(f_{t+1}\right)^{-1} Var\left(f_{t+1}\right)\delta R_{t+1}^{f} e^{\gamma+\delta'\mu_F+\frac{1}{2}\delta'\sigma_F^2\delta+\frac{1}{2}\sigma^2} \qquad \text{(IA.2)} \\ &= \delta R_{t+1}^{f} e^{\gamma+\delta'\mu_F+\frac{1}{2}\delta'\sigma_F^2\delta+\frac{1}{2}\sigma^2}. \qquad \text{(IA.3)}\end{aligned}$$

To compute alpha we use the standard definition

$$\alpha = E\left(R_{t+1}^{i}\right) - R_{t+1}^{f} - \beta' E\left(f_{t+1}\right), \qquad \text{(IA.4)}$$

where $E\left(f_{t+1}\right) = \mu_f$. Replacing the expressions for the expected return in (IA.1) and beta in (IA.3), we get

$$\alpha = R_f\left(e^{\gamma+\delta'\mu_F+\frac{1}{2}\delta'\sigma_F^2\delta+\frac{1}{2}\sigma^2}\left(1-\delta'\mu_F\right)-1\right). \qquad \text{(IA.5)}$$

Although we do not use them in the estimation, it is interesting to derive the continuous time limits for α and β. These are

$$\begin{aligned}\beta &= \delta \qquad \text{(IA.6)} \\ \alpha &= \gamma + \frac{1}{2}\delta'\sigma_f^2\delta + \frac{1}{2}\sigma^2. \qquad \text{(IA.7)}\end{aligned}$$

To obtain these formulas, one can start from the continuous-time equivalent of equation (2),

$$d\log\left(V_t\right) = \gamma dt + r_f dt + \delta' df_t + \sigma dZ_t, \qquad \text{(IA.8)}$$

where $df_t = \mu_f dt + \sigma_f dZ_{f,t}$, Z_t and $Z_{f,t}$ are independent vectors of standard Brownian motions, and r_f is the instantaneous risk-free rate. Then, apply Ito's lemma to equation (IA.8) to obtain the process for the return in levels.

$$\frac{dV_t}{V_t} = \left(\gamma + r_f + \delta'\mu_f + \frac{1}{2}\left(\sigma^2 + \delta'\sigma_f^2\delta\right)\right)dt + \sigma dZ_t + \delta'\sigma_f dZ_f. \qquad \text{(IA.9)}$$

Next, from equation (IA.9), we obtain beta using the standard definition

$$\begin{aligned}\beta &= Var\left(df_t\right)^{-1} Cov\left(df_t, \frac{dV_t}{V_t}\right) \\ &= \left(\sigma_f^2\right)^{-1} \sigma_f^2 \delta \\ &= \delta. \end{aligned} \tag{IA.10}$$

Finally, to obtain equation (IA.7), use the definition of alpha and the result in (IA.10):

$$\begin{aligned}\alpha dt &= E\left(\frac{dV_t}{V_t}\right) - r_f dt - \beta' E\left(df_t\right) \\ &= \left(\gamma + \frac{1}{2}\left(\sigma^2 + \delta' \sigma_f^2 \delta\right)\right) dt. \end{aligned}$$

II. Conditional Analysis

An issue that is always present when estimating risk exposures is that factor loadings may be correlated with factor realizations. A significant covariance between factor loadings and risk premia would cause the unconditional estimates to be biased (e.g., Jagannathan and Wang (1996) and Lewellen and Nagel (2006)). In our context, we can foresee that when expecting poor funding conditions, investment managers may choose to (or be forced to) reduce their exposure to refinancing risk by reducing the leverage ratio, for example. This behavior may ultimately induce positive correlation between liquidity risk realizations and loadings, which biases the estimates of alphas and betas if left unmodeled. To verify whether this is a valid concern, we follow Ferson and Harvey (1991) and Ferson and Harvey (1999) and let the betas be a linear function of conditioning information. In addition, this conditional analysis allows us to document the extent to which the liquidity risk premium varies over time.

A. Empirical Framework

Estimating the conditional risk premium for an asset involves a separate estimation of i) the conditional beta and ii) the conditional factor risk premium. The conditional risk premium of the asset is the product of the conditional beta and the conditional factor risk premium.

To estimate conditional betas, we adjust the approach of Ferson and Harvey (1999) to our context. We modify equation (4) and let the loading for factor k at time t be a linear function of a set of instruments Z_t :

$$\delta_{k,t} = b_{k,0} + b'_{k,1} Z_t. \tag{IA.11}$$

Similarly, we let the γ in equation (4) vary over time with the same set of instruments Z_t :

$$\gamma_t = a_0 + a'_1 Z_t. \tag{IA.12}$$

We obtain estimates of $b_{k,0}$ and $b_{k,1}$ from estimating this modified version of equation (4) on the same portfolio data from the previous subsection and using the same four risk factors. The time-varying risk loadings result from interacting the estimates of $b_{k,0}$ and $b_{k,1}$ with the instruments Z_t.[1]

To estimate the conditional factor risk premia, we run predictive rolling-window regressions. The rolling-window framework is adopted to allow for instability in the coefficients of the predictive regression. The dependent variable is the average realization of the factor in the 48 months between t and $t+47$,[2] and the independent variables are the instruments Z_{t-1} (measured at time $t-1$). The estimation sample ranges from month $t-60$ to month $t-1$. Then, the predicted risk premium at time t is constructed by multiplying the slopes from this predictive regression by the instruments measured at time t. The estimation sample ranges between October 1975 and December 2007. As suggested by Campbell and Thompson (2008), the predicted factor risk premium is constrained to be positive.

B. Empirical Results with the Five Instruments of Ferson and Harvey (1999)

First, we use the same five instruments as Ferson and Harvey (1999). These are: (1) the holding period return between time $t-1$ and time t for a three-month T-bill in excess of the return on a one-month T-bill (Bb3, data from CRSP); (2) the dividend yield on the S&P 500 (DY, data from Prof. Shiller's website); (3) the spread between Moody's Baa and Aaa corporate bond yields (Credit Spread, data from the St. Louis Fed); (4) the spread between a long-term (five-year) Treasury bond and one-year Treasury bond yields (Term Spread, data from CRSP); (5) the yield on a one-month T-bill at time t (Y1M).

In Table IA-I, Panel A, we report the slopes on the instruments from the conditional estimation of the four betas. Panel B reports the results from the predictive regressions of the four factor risk premia. To avoid reporting 200 regression results here, we report the estimates for December 1975, December 1980, . . . , and December 2004 (the last month for which the regression is possible). The standard errors are computed as in Newey and West (1987) with 47 lags to account for the autocorrelation of residuals due the overlap in the dependent variable. We note that the instruments display some predictive power for the factors. However, the magnitude and sign of the slopes change over time, which justifies our choice of using rolling windows for the estimation sample.

Panel C reports the distribution of the monthly conditional liquidity risk premium for private equity. We focus first on the results obtained with the conditional forecasts of the factor risk premium. We notice that while the average conditional risk premium is about 2.7% per year[3], it ranges between 0% (at the 25th percentile) and 5.4% (at the 75th percentile). So, in a quarter of the sample months the liquidity risk premium exceeds 5.4%. We also report statistics on the fraction of the total conditional risk premium of private equity (computed as the sum of the risk premia from the four factors) that is accounted for by liquidity risk. This ratio can be computed only in the months when both the numerator and the denominator are positive. The ratio is 37.8% on average and it ranges between 11.8% (at the 25th percentile) and 56.7% (at the 75th percentile). This shows that quite often liquidity risk can account for more than half of the cost of capital.

Because there is no consensus in the literature on the predictability of factor risk premia (see, for example, Goyal and Welch (2008)), in Table IA-I, Panel C, we also report the results when the forecasted risk premium is simply equal to the unconditional mean of the 48 month factor realizations. The variation in the conditional liquidity risk premium is naturally smaller than what we reported above. Yet liquidity risk continues to represent at times an important component of the total risk premium for private equity.

C. Empirical Results with a Restricted Set of Instruments

In Table IA-I, we note that no instrument is individually significant. We impute the lack of significance to the low power of these tests given that the estimation sample consists of only 139 portfolios. For this reason, we also show results with a narrower set of conditioning variables. The instruments with the best predictive power for the conditional betas are the credit spread and Y1M. Table IA-II thus shows the results when we use only these two instruments. As expected, in Panel A, the statistical significance of the instruments is somewhat higher than in the previous table. In particular, we notice that the relation between liquidity risk beta and the credit spread is marginally significant at the 10% level. As in the previous table, Panel B shows the predictive regressions for the factor risk premia and we observe that the instruments are stronger predictors of the factors.

Finally, in Panel C, Table IA-II, we notice that the variation in the conditional liquidity risk premium is of similar magnitude to that reported in Table IA-I, regardless of whether we use conditional forecasts of the factor risk premia or not.

To summarize, we show that in some periods of our sample the conditional liquidity premium goes well beyond the 3% unconditional estimate. The dependence of the betas on conditioning information appears to be marginal. Rather, much of the time variation comes from time variation in the factor risk premia. The finding that the betas are insignificantly related to the conditioning variables that drive the risk premia likely suggests that the covariance between factor loadings and factor risk premia is negligible. This fact, in turn, implies that the asset pricing model holds conditionally as well as unconditionally (see, for example, Jagannathan and Wang (1996) and Lewellen and Nagel (2006)). This conclusion addresses the concern that motivated us to pursue the conditional analysis and legitimates the results from the unconditional estimation above.

Tables IA-I and IA-II here

III. Liquidity Risk and Liquidity Level

As pointed out by Acharya and Pedersen (2005), among others, liquidity varies over time and displays commonality across securities and asset classes. Recent theoretical and empirical results in asset pricing suggest that the commonality in liquidity is a priced risk factor (liquidity risk, see footnote 1 for references). The premium in returns that is due to liquidity risk is different from the premium that depends on the average liquidity level of an asset.

Aggregate liquidity is a priced risk factor in a CAPM world with time-varying transaction costs, as in Acharya and Pedersen (2005). In this context, liquidity risk emerges as the covariance of asset specific returns and transaction costs with aggregate transaction costs, which in turn are a component of gross market returns. Also, as argued by Bekaert, Harvey, and Lundblad (2007), aggregate liquidity can become a priced risk factor in rational models where liquidity shocks are correlated with preferences (e.g., Vayanos (2004)) or behavioral models where liquidity partially reflects the presence or absence of rational investors in the market (e.g., Baker and Stein (2004)).

Unlike the premium for liquidity risk, the compensation for the average liquidity level of an asset can emerge even with risk-neutral investors. Amihud, Mendelson, and Pedersen (2005) provide a simple explanation. An investor who buys a security and expects to pay transactions costs when selling it will take this into account, and so will the other investors to which the security is sold. Hence, the price of a security is discounted by the present value of the transaction costs over its life time. This price discount translates into a return premium, which is higher for more illiquid assets.

In this paper we focus on the compensation for systematic risk originating from the covariance of private equity returns with aggregate liquidity (liquidity risk) rather than on the asset-specific liquidity characteristic (liquidity level).

As for the premium in private equity returns that originates from the average liquidity level of these investments, the only study touching upon this topic that we are aware of is by Lerner and Schoar (2004). They propose a model and provide supporting empirical evidence showing that the liquidity level of private equity funds is a decision variable for fund managers. Fund managers deliberately make the fund stakes illiquid to screen investors that are less likely to face a liquidity shock.

In our empirical analysis, we control for the liquidity level of the investments using fund size as a proxy (see Table X). Fund size is measured as the dollar amount that is committed to the private equity fund that makes the investment (in January 2007 dollars). We conjecture that this variable proxies for the liquidity level of the investment. The intuition is that bigger funds are raised by more established and visible private equity houses. Hence, they can get better terms when exiting their investments, in terms of both timing and price. In other words, if KKR wants to dispose of an investment it is reasonable to conclude that it can do so more quickly and with less price impact. In all specifications, fund size is not significantly related to returns, while the main results on the impact of liquidity risk on private equity returns are unaffected. Given this evidence, we conclude that the observed link between private equity returns and liquidity innovations originates from liquidity risk in private equity and is not likely to be due to a premium for the average illiquidity of the investment.

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Table IA-I

Conditional Analysis: Five instruments

The table reports results from the estimation of the conditional risk premium of private equity. The conditional liquidity risk premium is the product of the conditional liquidity beta and the conditional risk premium on the Pástor and Stambaugh (2003) factor (IML_PS). We proceed in the same way to estimate conditional risk premia originating from the other risk factors (Rm-Rf, HML, SMB). The conditional beta is estimated as in Ferson and Harvey (1999) assuming that beta is a linear function of a set of instruments. For this table, the instruments are: (1) the holding-period return between time $t-1$ and time t for a three-month T-bill in excess of the return on a one-month T-bill (Bb3, data from CRSP); (2) the dividend yield on the S&P 500 (DY, data from Prof. Shiller's website); (3) the spread between Moody's Baa and Aaa corporate bond yields (Credit Spread, data from the St. Louis Fed); (4) the spread between long-term (five-year) Treasury bond and one-year Treasury bond yields (Term Spread, data from CRSP); and (5) the yield on a one-month T-bill at time t (Y1M). To estimate the conditional factor risk premia, we run predictive regressions on 60-month rolling windows. The dependent variable is the average realization of the factor in the 48 months between t and $t+47$, and the independent variables are the instruments Z_{t-1} (measured at time $t-1$). The estimation sample ranges from month $t-1$ to month $t-60$. The predicted factor risk premium at time t is constructed multiplying the slopes from this predictive regression with the instruments measured at time t. As in Campbell and Thompson (2008), whenever the predicted factor risk premium is negative, we replace it with zero. We also report results in which the forecast risk premium is equal to the unconditional mean of the 48 month factor realizations. Panel A has the estimates from the conditional beta specifications for each of the four factors. The estimation sample consists of the 139 portfolios of at least 20 private equity investments sorted on their start date. t-statistics are given in parentheses. Panel B reports the predictive regression estimates for selected estimation windows. Standard errors are computed as in Newey and West (1987) with 47 lags. t-statistics are given in parentheses. The estimation sample for these regressions ranges between October 1975 and December 2004. Panel C reports the distribution for the conditional liquidity risk premium.

Panel A: Conditional Beta Regressions				
Interaction with:	Factors			
	IML_PS	Rm - Rf	HML	SMB
Bb3	2.063	-0.870	-7.146	9.051
	(0.487)	(-0.130)	(-0.875)	(1.507)
DY	-8.969	-13.082	-34.656	-56.101
	(-0.211)	(-0.171)	(-0.424)	(-0.864)
Credit cpread	-1.022	0.502	0.115	0.895
	(-0.850)	(0.411)	(0.056)	(0.535)
Term spread	0.111	0.634	1.005	0.495
	(0.222)	(0.786)	(0.892)	(0.631)
Y1M	1.599	-0.673	1.825	2.885
	(0.616)	(-0.179)	(0.320)	(0.739)
Constant	0.821	0.200	-0.462	-2.402
	(0.705)	(0.118)	(-0.184)	(-1.307)

Table IA-I: continued

Panel B: Predictive Regressions for Selected Months								
Date:	Forecast factor:	Instruments						
		Bb3	DY	Credit Spread	Term Spread	Y1M	Constant
December 1975	IML_PS	-0.354	0.161	-2.639	-0.041	-46.521	3.383
		(-1.783)	(0.552)	(-1.879)	(-0.124)	(-3.304)	(6.530)
	Rm - Rf	-0.057	-0.039	0.428	-0.025	56.476	-2.1
		(-0.491)	(-0.526)	(0.826)	(-0.134)	(10.245)	(-9.053)
	HML	0.096	-0.31	-1.343	-0.172	-18.156	2.234
		(1.024)	(-6.746)	(-4.633)	(-3.538)	(-5.089)	(13.146)
	SMB	0.396	-0.077	2.71	0.093	40.581	-2.789
		(2.694)	(-0.386)	(2.917)	(0.375)	(3.855)	(-8.329)
December 1985	IML_PS	0.118	0.333	0.467	-0.571	16.755	-0.161
		(1.077)	(5.166)	(1.092)	(-4.813)	(2.746)	(-0.228)
	Rm - Rf	-0.139	0.172	-0.456	-0.484	48.505	-0.97
		(-2.280)	(8.725)	(-3.823)	(-6.740)	(7.322)	(-3.904)
	HML	0.32	-0.198	0.222	0.295	-18.821	0.961
		(6.212)	(-4.775)	(1.087)	(3.951)	(-3.111)	(3.609)
	SMB	0.158	-0.184	0.078	0.295	11.723	-0.882
		(4.244)	(-9.345)	(0.590)	(6.324)	(6.299)	(-6.053)
December 1995	IML_PS	-0.510	0.139	1.462	1.052	-69.053	1.866
		(-1.503)	(3.231)	(5.022)	(3.626)	(-3.070)	(5.112)
	Rm - Rf	-1.387	-0.255	-0.523	0.751	15.717	2.263
		(-3.067)	(-9.179)	(-2.606)	(2.285)	(0.483)	(4.214)
	HML	0.357	0.153	0.582	-0.652	45.189	-1.714
		(4.320)	(4.502)	(2.922)	(-2.654)	(8.304)	(-16.284)
	SMB	1.07	0.182	-0.270	-0.013	12.618	-1.542
		(1.734)	(4.874)	(-0.747)	(-0.051)	(0.323)	(-2.142)
December 2004	IML_PS	-0.152	0.192	-1.681	3.115	4.816	0.324
		(-0.515)	(1.369)	(-1.467)	(4.388)	(0.169)	(0.594)
	Rm - Rf	0.917	0.208	0.836	1.74	137.81	-3.019
		(3.625)	(2.066)	(1.282)	(1.781)	(6.202)	(-7.293)
	HML	0.162	-0.023	1.877	-0.244	3.600	0.137
		(0.678)	(-0.255)	(2.866)	(-0.432)	(0.255)	(0.321)
	SMB	0.708	0.188	3.282	2.352	27.225	-1.619
		(7.426)	(4.053)	(4.628)	(6.246)	(0.852)	(-2.140)

Table IA-I: continued

Panel C: Distribution of the Conditional Liquidity Premium				
			Interquantile Range	
	Mean	Std. Dev.	25%	75%
With conditional forecast of factor risk premia:				
Conditional liquidity risk premium (%, annual)	2.703	4.519	0.000	5.417
Liquidity risk premium / Total risk premium (%)	37.828	27.297	11.893	56.716
With unconditional forecast of factor risk premia:				
Conditional liquidity risk premium (%, annual)	1.894	1.764	0.969	3.126
Liquidity risk premium / Total risk premium (%)	40.780	26.855	19.105	60.055

Table IA-II

Conditional analysis: Two instruments

The table reports results from the estimation of the conditional risk premium of private equity. The conditional liquidity risk premium is the product of the conditional liquidity beta and the conditional risk premium on the Pástor and Stambaugh (2003) factor (IML_PS). We proceed in the same way to estimate conditional risk premia originating from the other risk factors (Rm-Rf, HML, SMB). The conditional beta is estimated as in Ferson and Harvey (1999) assuming that beta is a linear function of a set of instruments. For this table, the instruments are: (1) the spread between Moody's Baa and Aaa corporate bond yields (Credit Spread, data from the St. Louis Fed); (2) the yield on a one-month T-bill at time t (Y1M). To estimate the conditional factor risk premia, we run predictive regressions on 60 rolling windows. The dependent variable is the average realization of the factor in the 48 months between t and $t + 47$, the independent variables are the instruments Z_{t-1} (measured at time $t - 1$). The estimation sample ranges from month $t - 1$ to month $t - 60$. Then, the predicted factor risk premium at time t is constructed multiplying the slopes from this predictive regression with the instruments measured at time t. As in Campbell and Thompson (2008), whenever the predicted factor risk premium is negative, we replace it with zero. We also report results in which the forecast risk premium is equal to the unconditional mean of the 48 month factor realizations. Panel A has the estimates from the conditional beta specifications for each of the four factors. The estimation sample consists of the 139 portfolios of at least twenty private equity investments sorted on their start date. t-statistics are given in parentheses. Panel B has the predictive regression estimates for selected estimation windows. Standard errors are computed as in Newey and West (1987) with 47 lags. t-statistics are given in parentheses. The estimation sample for these regressions ranges between October 1975 and December 2004. Panel C reports the distribution for the conditional liquidity risk premium.

Panel A: Conditional Beta Regressions				
Interaction with:	Factors			
	IML_PS	Rm - Rf	HML	SMB
Credit spread	-1.295	0.899	-1.140	1.438
	(-1.839)	(0.868)	(-0.700)	(1.167)
Y1M	0.005	-3.595	-5.117	0.621
	(0.004)	(-2.007)	(-2.770)	(0.379)
Constant	1.892	0.803	3.531	-2.126
	(2.337)	(0.639)	(2.234)	(-1.629)

Table IA-II: continued

Panel B: Predictive Regressions for Selected Months				
Date:	Forecast factor:	Instruments		
		Credit Spread	Y1M	Constant
December 1975	IML_PS	-0.850	-4.779	3.373
		(-3.905)	(-8.733)	(9.783)
	Rm - Rf	0.663	2.333	-1.831
		(7.712)	(8.391)	(-13.263)
	HML	-0.408	-0.499	1.626
		(-3.931)	(-2.454)	(10.726)
	SMB	0.885	4.288	-2.678
		(6.033)	(11.256)	(-11.115)
December 1985	IML_PS	0.057	-0.652	1.893
		(0.555)	(-2.133)	(4.140)
	Rm - Rf	0.178	-0.718	1.113
		(4.023)	(-3.645)	(6.086)
	HML	0.268	0.825	-0.486
		(7.722)	(5.456)	(-3.461)
	SMB	0.384	0.853	-1.475
		(10.888)	(9.588)	(-11.506)
December 1995	IML_PS	-1.091	0.960	0.765
		(-11.078)	(3.000)	(7.335)
	Rm - Rf	-1.473	0.876	1.963
		(-9.112)	(5.997)	(12.333)
	HML	1.106	-0.386	-0.472
		(8.691)	(-1.486)	(-4.899)
	SMB	1.507	-1.266	-0.908
		(10.809)	(-7.125)	(-8.743)
December 2004	IML_PS	-0.032	-2.299	0.739
		(-0.150)	(-5.278)	(4.436)
	Rm - Rf	1.108	-1.645	-0.295
		(3.813)	(-6.942)	(-0.876)
	HML	0.151	1.913	0.157
		(0.689)	(7.939)	(0.651)
	SMB	0.832	2.332	-0.826
		(5.350)	(7.153)	(-3.304)

Table IA-II: continued

Panel C: Distribution of the Conditional Liquidity Premium				
			Interquantile Range	
	Mean	Std. Dev.	25%	75%
With conditional forecast of factor risk premia:				
Conditional liquidity risk premium (%, annual)	1.712	4.960	0.000	4.487
Liquidity risk premium / Total risk premium (%)	38.661	29.163	13.474	65.424
With unconditional forecast of factor risk premia:				
Conditional liquidity risk premium (%, annual)	2.710	2.919	1.345	4.780
Liquidity risk premium / Total risk premium (%)	47.711	26.195	31.178	70.851

Table IA-III

Altering the Number of Investments per Portfolio: Risk Models

The table reports the results of OLS regression factor models for private equity returns. The dependent variable is the logarithm of a measure of performance in excess of the log risk-free rate. The performance measure is the modified internal rate of return (MIRR) assuming S&P 500 rate of re-investment. Each observation corresponds to a portfolio of I private equity investments sorted by the starting date of the investment. In Panel A, I is 5. In Panel B, I is 30. In Panel C, I is 50. Each observation is weighted by the square root of the investment duration to correct for unequal variance. Explanatory variables include the Fama and French (1993) three factors (excess market return, HML, SMB) and the illiquid-minus-liquid portfolio (IML_PS) by Pastor and Stambaugh (2003). Each explanatory variable is computed by taking its average value during the investment's life. All variables are in monthly frequency. All specifications are run between October 1975 and December 2007. t-statistics are given in parentheses. The table also reports the estimate of the residual standard deviation (sigma) and the number of observations (N).

	Panel A: I = 5			Panel B: I = 30			Panel C: I = 50		
IML_PS			0.651			0.678			0.671
			(3.591)			(3.238)			(2.869)
Rm-Rf	1.007	1.596	1.538	1.001	1.526	1.299	0.989	1.565	1.413
	(5.627)	(6.250)	(6.164)	(6.083)	(4.798)	(4.166)	(5.156)	(3.976)	(3.751)
HML		1.429	1.584		0.596	0.93		0.725	1.028
		(4.257)	(4.795)		(1.776)	(2.761)		(1.823)	(2.626)
SMB		-0.454	-0.162		0.071	0.034		-0.030	0.027
		(-1.614)	(-0.567)		(0.252)	(0.127)		(-0.085)	(0.082)
Constant	0.006	-0.003	-0.005	0.005	-0.001	-0.002	0.005	-0.001	-0.003
	(4.557)	(-1.229)	(-2.094)	(4.784)	(-0.262)	(-0.626)	(4.177)	(-0.376)	(-0.814)
Sigma	0.078	0.076	0.074	0.046	0.045	0.043	0.042	0.041	0.039
Adj. R^2	0.703	0.723	0.736	0.863	0.866	0.878	0.885	0.888	0.899
N	237	237	237	103	103	103	68	68	68

Table IA-IV

Altering the Number of Investments Per Portfolio: Risk Premium, Cost of Capital, and Alpha

The table reports the cost of capital for each of the models estimated in Table IA-III and the portfolios formed using different values for the minimum number of investments (I). The risk premium is the sum of the products of the factor loadings times the average factor realizations. The cost of capital is the sum of the average risk-free rate plus the risk premium. Alphas and betas are computed using equations (6) and (7) in the text. The reported values (in %) are annualized by multiplying the monthly estimate by 12. The standard errors are computed using the delta method. t-statistics are given in parentheses.

	Panel A: I = 5			Panel B: I = 30			Panel C: I = 50		
	Market	FF	PS	Market	FF	PS	Market	FF	PS
Total risk premium	7.773%	18.289%	22.501%	7.705%	15.006%	17.973%	7.612%	15.661%	19.298%
	(5.642)	(5.918)	(6.970)	(6.129)	(3.926)	(4.801)	(5.222)	(3.393)	(4.275)
Risk premium components:									
$\beta_{liq} \times \mu_{liq}$			2.992%			3.110%			3.076%
			(3.625)			(3.315)			(2.977)
$\beta_{mkt} \times \mu_{mkt}$	7.773%	12.321%	11.885%	7.705%	11.753%	10.013%	7.612%	12.051%	10.895%
	(5.642)	(6.282)	(6.212)	(6.129)	(4.874)	(4.262)	(5.222)	(4.081)	(3.887)
$\beta_{hml} \times \mu_{hml}$		7.307%	8.103%		3.043%	4.750%		3.697%	5.247%
		(4.288)	(4.841)		(1.811)	(2.828)		(1.878)	(2.726)
$\beta_{smb} \times \mu_{smb}$		-1.339%	-0.479%		0.210%	0.101%		-0.088%	0.080%
		(-1.628)	(-0.574)		(0.257)	(0.131)		(-0.088)	(0.085)
Risk-free rate (in sample)	5.816%	5.816%	5.816%	5.816%	5.816%	5.816%	5.816%	5.816%	5.816%
Cost of capital (in sample)	13.589%	24.105%	28.317%	13.521%	20.822%	23.790%	13.428%	21.477%	25.114%
	(9.863)	(7.800)	(8.772)	(10.755)	(5.447)	(6.355)	(9.211)	(4.653)	(5.564)
Alpha	11.898%	1.837%	-1.518%	8.545%	2.291%	0.181%	8.392%	1.348%	-1.154%
	(9.511)	(0.730)	(-0.573)	(8.679)	(0.760)	(0.059)	(7.421)	(0.377)	(-0.319)

Table IA-V

Liquidity Conditions versus Risk of Economic Conditions

The table reports the output of OLS regressions. The dependent variable is the investment annualized MIRR. The MIRR assumes the dividends are re-invested in the S&P 500. Each explanatory variable is standardized by removing the sample average and dividing by the sample standard deviation. Standard errors are clustered at the investment year level and corresponding t-statistics are reported below each coefficient in parentheses. The sample is October 1975 to December 2007, except for the regressions with the VIX index, for which the sample starts in January 1986.

Panel A: Separate Controls for the Risk of Economic Conditions								
M&A cycles	0.033							
	(0.986)							
IPO cycles		0.073						
		(2.770)						
Delta credit spread			-0.059					
			(-2.054)					
Industrial production growth				0.132				
				(5.412)				
Delta VIX					-0.009			
					(-0.383)			
Delta realized long-term volatility						0.025		
						(0.992)		
Delta inflation							-0.044	
							(-1.224)	
Credit spread								-0.345
								(-2.031)
Country and industry fixed effects	no	no	no	no	no	no	no	no
Adj. R^2	0.003	0.015	0.010	0.050	0.000	0.002	0.005	0.008
N	4403	4403	4403	4403	4286	4403	4403	4403

Table IA-V: continued

Panel B: Controlling for Liquidity Conditions									
P&S liquidity conditions	0.132	0.115	0.119	0.092	0.125	0.129	0.123	0.121	0.077
	(4.867)	(4.223)	(4.596)	(4.649)	(4.285)	(4.431)	(4.480)	(4.279)	(3.851)
M&A cycles	0.049								-0.080
	(1.890)								(-1.521)
IPO cycles		0.030							-0.101
		(1.385)							(-1.463)
Delta credit spread			-0.030						-0.031
			(-1.378)						(-1.717)
Industrial production growth				0.101					0.207
				(4.939)					(3.787)
Delta VIX					-0.008				-0.032
					(-0.281)				(-1.387)
Delta realized long-term volatility						0.035			0.071
						(1.788)			(3.168)
Delta inflation							-0.030		-0.029
							(-1.126)		(-1.251)
Credit spread								-0.128	0.042
								(-0.886)	(0.088)
Country and industry fixed effects	no	no	no	no	no	no	no	no	no
Adj. R^2	0.052	0.047	0.047	0.071	0.046	0.048	0.048	0.046	0.093
N	4403	4403	4403	4403	4286	4403	4403	4403	4286

Table IA-V: continued

Panel C: Adding Investment Characteristics									
P&S liquidity conditions	0.130	0.118	0.117	0.094	0.124	0.127	0.123	0.124	0.078
	(4.833)	(4.611)	(4.721)	(4.834)	(4.403)	(4.541)	(4.630)	(4.691)	(3.864)
M&A cycles	0.038								-0.084
	(1.585)								(-1.620)
IPO cycles		0.021							-0.104
		(1.035)							(-1.549)
Delta credit spread			-0.032						-0.029
			(-1.503)						(-1.555)
Industrial production growth				0.093					0.207
				(4.472)					(3.865)
Delta VIX					-0.012				-0.031
					(-0.440)				(-1.396)
Delta realized long-term volatility						0.026			0.067
						(1.377)			(3.015)
Delta inflation							-0.020		-0.023
							(-0.778)		(-0.962)
Credit spread								-0.039	0.059
								(-0.282)	(0.125)
Rm-Rf	0.056	0.065	0.047	0.011	0.051	0.053	0.057	0.066	-0.056
	(1.478)	(1.696)	(1.265)	(0.262)	(1.459)	(1.477)	(1.659)	(1.800)	(-1.105)
Growth investment	-0.065	-0.068	-0.072	-0.058	-0.064	-0.069	-0.068	-0.070	-0.055
	(-4.045)	(-3.911)	(-3.962)	(-3.368)	(-3.470)	(-4.022)	(-3.740)	(-3.828)	(-3.374)
Size	0.003	0.004	0.001	0.012	0.002	-0.001	0.004	0.002	0.000
	(0.263)	(0.339)	(0.036)	(0.880)	(0.135)	(-0.063)	(0.279)	(0.149)	(0.015)
PE house age	0.022	0.021	0.024	0.016	0.023	0.022	0.022	0.023	0.021
	(1.371)	(1.414)	(1.547)	(1.049)	(1.530)	(1.468)	(1.464)	(1.515)	(1.479)
U.S. investment	-0.006	-0.010	-0.009	-0.008	-0.010	-0.005	-0.009	-0.009	-0.004
	(-0.416)	(-0.699)	(-0.672)	(-0.553)	(-0.694)	(-0.384)	(-0.661)	(-0.628)	(-0.312)
Country and industry fixed effects	no	no	no	no	no	no	no	no	no
Adj. R^2	0.064	0.061	0.063	0.081	0.058	0.062	0.061	0.060	0.101
N	4403	4403	4403	4403	4286	4403	4403	4403	4286

Table IA-V: continued

	Panel D: Adding Country and Industry Fixed Effects								
P&S liquidity conditions	0.089	0.093	0.083	0.088	0.091	0.091	0.090	0.094	0.085
	(2.568)	(3.174)	(2.744)	(3.002)	(3.009)	(2.871)	(2.957)	(3.188)	(2.864)
M&A cycles	-0.003								-0.078
	(-0.094)								(-1.864)
IPO cycles		-0.017							-0.077
		(-0.552)							(-1.276)
Delta credit spread			-0.043						-0.052
			(-2.242)						(-2.743)
Industrial production growth				0.095					0.207
				(2.775)					(3.961)
Delta VIX					-0.015				-0.063
					(-0.586)				(-2.284)
Delta realized long-term volatility						0.002			0.077
						(0.125)			(4.276)
Delta inflation							-0.005		-0.022
							(-0.213)		(-0.979)
Credit spread								0.215	0.233
								(1.236)	(0.566)
Rm-Rf	0.052	0.058	0.039	0.004	0.045	0.051	0.050	0.061	-0.057
	(1.397)	(1.476)	(1.030)	(0.099)	(1.294)	(1.432)	(1.440)	(1.662)	(-1.173)
Growth investment	-0.089	-0.090	-0.091	-0.081	-0.083	-0.088	-0.088	-0.093	-0.082
	(-5.417)	(-5.141)	(-5.278)	(-4.882)	(-4.619)	(-5.282)	(-4.918)	(-5.196)	(-4.942)
Size	0.005	0.004	0.005	0.009	0.007	0.005	0.006	0.004	0.001
	(0.429)	(0.323)	(0.400)	(0.725)	(0.578)	(0.412)	(0.468)	(0.336)	(0.115)
PE house age	0.025	0.026	0.026	0.021	0.023	0.025	0.025	0.029	0.024
	(1.955)	(2.102)	(1.980)	(1.781)	(1.949)	(1.918)	(1.950)	(2.322)	(2.065)
Country and industry fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes
Adj. R^2	0.114	0.114	0.118	0.124	0.114	0.114	0.114	0.116	0.150
N	4403	4403	4403	4403	4286	4403	4403	4403	4286

Table IA-VI

Other Liquidity Factors

The table reports the output of OLS regressions. The dependent variable is the investment annualized MIRR. MIRR assumes dividends are re-invested in the S&P 500. A first set of explanatory variables results from taking the average over the investment life of: i) liquidity conditions as measured by the Acharya and Pedersen (2005) factor (Panel A) and the Sadka (2006) factor (Panel B); ii) tightening of credit standards, the fraction of survey respondents who report to have tightened their credit standards (source: Fed Senior Officer Survey); iii) industrial production growth (source: St. Louis Fed); iv) change in credit spread,difference between Baa and Aaa yield (source: St. Louis Fed); v) number of M&A deals in a month divided by the number of stocks in CRSP at the beginning of the month; vi) change in the standard deviation of the next 48 months of CRSP value-weighted stock-market index returns (labeled "Delta realized long-term volatility"); and vii) (monthly) return on the stock market index minus the risk-free rate. A second set of explanatory variables includes investment characteristics: i) a dummy variable that takes the value one if the investment is classified as growth (zero otherwise); ii) investment size (i.e., equity invested in January 2007 dollars); and iii) the size (in January 2007 dollars) of the fund by which the investment is made. A growth investment is one that mainly consists of an equity investment (little or no leverage); the classification is made by CEPRES, our data provider. Investment size is relative to same-year investments and is winsorized (at 5th and 95th percentiles of same-year investments). Country and industry fixed effects are added to the set of explanatory variables. Each explanatory variable is standardized by removing the sample mean and dividing by the sample standard deviation. Standard errors are clustered at the investment year and corresponding t-statistics are reported below each coefficient in parentheses. The sample ranges from April 1990 to December 2007 in Panel A and between April 1990 and December 2005 in Panel B (given the shorter time series over which the Sadka factor is available).

Panel A: Regressions with Acharya and Pedersen (2005) Liquidity Factor								
A&P liquidity conditions	0.083		0.016	0.090	0.075	0.087	0.087	0.015
	(3.334)		(0.636)	(3.473)	(2.389)	(2.576)	(3.759)	(0.487)
Tightening of credit standards		-0.195	-0.185					-0.192
		(-6.243)	(-5.436)					(-5.404)
Industrial production growth				0.111				0.001
				(3.088)				(0.024)
Delta credit spread					-0.017			0.010
					(-0.574)			(0.374)
Relative number of M&A deals						0.008		0.004
						(0.205)		(0.090)
Delta ex-post long-term volatility							0.016	-0.021
							(0.608)	(-0.542)
Rm-Rf	0.100	-0.013	-0.010	0.013	0.098	0.096	0.097	-0.012
	(3.509)	(-0.424)	(-0.306)	(0.384)	(3.546)	(3.215)	(3.279)	(-0.265)
Growth investment	-0.039	-0.042	-0.042	-0.034	-0.039	-0.039	-0.040	-0.041
	(-2.102)	(-2.425)	(-2.423)	(-1.864)	(-2.096)	(-2.161)	(-2.168)	(-2.518)
Investment size	0.000	-0.001	-0.002	0.007	0.000	0.000	-0.001	0.000
	(0.031)	(-0.122)	(-0.164)	(0.526)	(-0.000)	(0.036)	(-0.060)	(-0.013)
Fund size	-0.002	-0.003	-0.003	-0.003	-0.002	-0.002	-0.002	-0.003
	(-0.333)	(-0.701)	(-0.649)	(-0.497)	(-0.329)	(-0.393)	(-0.461)	(-0.508)
Country and industry fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Adj. R^2	0.080	0.118	0.119	0.095	0.081	0.080	0.081	0.120
N	3763	3763	3763	3763	3763	3763	3763	3763

Table IA-VI: continued

Panel B: Regressions with Sadka (2006) Liquidity Factor								
Sadka liquidity conditions	0.064		0.017	0.070	0.055	0.057	0.062	0.054
	(3.721)		(1.222)	(3.998)	(2.413)	(3.541)	(3.833)	(3.496)
Tightening of credit standards		-0.181	-0.173					-0.102
		(-4.846)	(-4.358)					(-1.986)
Industrial production growth				0.126				0.075
				(2.881)				(1.566)
Delta credit spread					-0.034			0.019
					(-1.109)			(0.787)
Relative number of M&A deals						-0.048		0.085
						(-1.563)		(1.451)
Delta ex-post long term volatility							-0.120	-0.223
							(-2.912)	(-3.128)
Rm-Rf	0.099	-0.007	-0.005	0.001	0.094	0.121	0.112	-0.032
	(3.257)	(-0.207)	(-0.154)	(0.024)	(3.335)	(3.442)	(3.628)	(-0.722)
Growth investment	-0.048	-0.048	-0.048	-0.044	-0.049	-0.051	-0.050	-0.044
	(-2.422)	(-2.532)	(-2.538)	(-2.255)	(-2.457)	(-2.709)	(-2.606)	(-2.409)
Investment size	-0.018	-0.014	-0.015	-0.011	-0.019	-0.020	-0.019	-0.011
	(-1.314)	(-1.109)	(-1.184)	(-0.770)	(-1.382)	(-1.433)	(-1.396)	(-0.785)
Fund size	-0.004	-0.003	-0.004	-0.006	-0.004	-0.002	0.000	-0.002
	(-0.839)	(-0.702)	(-0.794)	(-1.150)	(-0.788)	(-0.410)	(-0.093)	(-0.345)
Country and industry fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Adj. R^2	0.076	0.110	0.111	0.095	0.079	0.081	0.091	0.125
N	3410	3410	3410	3410	3410	3410	3410	3410

Table IA-VII

Subsample of U.S. Investments

The table reports the output of OLS regressions. The dependent variable is the investment annualized MIRR. MIRR assumes dividends are re-invested in the S&P 500. The sample is restricted to the investments made in the U.S. A first set of explanatory variables results from taking the average over the investment life of: i) aggregate liquidity innovations as measured by Pástor and Stambaugh (2003) (labeled "P&S liquidity conditions") ii) tightening of credit standards, the fraction of survey respondents who report to have tightened their credit standards (source: Fed Senior Officer Survey); iii) industrial production growth (source: St. Louis Fed); iv) change in credit spread, difference between Baa and Aaa yield (source: St. Louis Fed); v) number of M&A deals in a month divided by the number of stocks in CRSP at the beginning of the month; vi) change in the standard deviation of the next 48 months of CRSP value-weighted stock-market index returns (labeled "Delta realized long-term volatility"); and vii) (monthly) return on the stock market index minus the risk-free rate. A second set of explanatory variables includes investment characteristics: i) a dummy variable that takes the value one if the investment is classified as growth (zero otherwise); ii) investment size (i.e. equity invested in January 2007 dollars); and iii) the size (in January 2007 dollars) of the fund by which the investment is made. A growth investment is one that mainly consists of an equity investment (little or no leverage); the classification is made by CEPRES, our data provider. Investment size is relative to same-year investments and is winsorized (at 5th and 95th percentiles of same-year investments). Country and industry fixed effects are added to the set of explanatory variables. Each explanatory variable is standardized by removing the sample mean and dividing by the sample standard deviation. Standard errors are clustered at the investment year and corresponding t-statistics are reported below each coefficient in parentheses. The sample ranges from April 1990 to December 2007.

P&S liquidity conditions	0.132		0.070	0.123	0.122	0.118	0.124	0.063
	(3.240)		(2.206)	(3.179)	(2.935)	(2.945)	(3.316)	(2.285)
Tightening of credit standards		-0.238	-0.195					-0.218
		(-5.265)	(-5.707)					(-3.731)
Industrial production growth				0.092				-0.018
				(1.743)				(-0.298)
Delta credit spread					-0.029			0.019
					(-0.979)			(0.642)
Relative number of M&A deals						-0.056		0.010
						(-1.386)		(0.133)
Delta realized long-term volatility							-0.061	-0.082
							(-1.489)	(-1.206)
Rm-Rf	0.104	0.010	0.009	0.043	0.104	0.132	0.113	0.017
	(2.544)	(0.229)	(0.210)	(0.689)	(2.592)	(2.652)	(2.820)	(0.268)
Growth investment	-0.014	-0.022	-0.019	-0.011	-0.016	-0.022	-0.017	-0.021
	(-0.560)	(-0.996)	(-0.860)	(-0.425)	(-0.606)	(-0.985)	(-0.661)	(-1.066)
Investment size	-0.040	-0.046	-0.047	-0.034	-0.042	-0.042	-0.035	-0.041
	(-1.953)	(-2.512)	(-2.583)	(-1.698)	(-1.918)	(-2.024)	(-1.652)	(-2.296)
Fund size	-0.006	-0.001	0.002	0.000	-0.005	-0.004	-0.001	0.007
	(-0.282)	(-0.075)	(0.126)	(0.012)	(-0.255)	(-0.197)	(-0.072)	(0.388)
Country and industry fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Adj. R^2	0.135	0.166	0.177	0.144	0.137	0.140	0.140	0.184
N	1283	1283	1283	1283	1283	1283	1283	1283

Table IA-VIII

Positive and Negative Liquidity Conditions

The table reports the output of OLS regressions. It replicates the analysis in Table VII replacing the P&S liquidity conditions as a control variable with P&S negative liquidity innovations and P&S positive liquidity innovations. The dependent variable is the investment annualized MIRR. MIRR assumes dividends are re-invested in the S&P 500. Each explanatory variable is standardized by removing the sample average and dividing by the sample standard deviation. Standard errors are clustered at the investment year level and corresponding t-statistics are reported below each coefficient in parentheses. The variable "tightening of credit standards" is available starting in April 1990. Hence, the sample ranges from April 1990 to December 2007.

P&S positive liquidity conditions	0.005	0.014	0.004	0.007	-0.019	-0.005	0.007
	(0.187)	(0.565)	(0.180)	(0.257)	(-0.770)	(-0.208)	(0.267)
P&S negative liquidity conditions	0.140	0.065	0.133	0.137	0.175	0.147	0.082
	(5.886)	(2.933)	(6.130)	(6.002)	(5.238)	(5.999)	(2.285)
Tightening of credit standards		-0.146					-0.137
		(-4.296)					(-3.179)
Industrial production growth			0.074				0.003
			(2.273)				(0.085)
Delta credit spread				-0.012			0.001
				(-0.497)			(0.031)
Relative number of M&A deals					0.076		0.032
					(2.070)		(0.745)
Delta realized long-term volatility						0.040	-0.013
						(2.113)	(-0.378)
Rm-Rf	0.059	-0.008	0.006	0.058	0.012	0.051	-0.023
	(2.033)	(-0.246)	(0.155)	(1.982)	(0.335)	(1.701)	(-0.490)
Growth investment	-0.043	-0.042	-0.038	-0.042	-0.040	-0.045	-0.041
	(-2.472)	(-2.573)	(-2.249)	(-2.459)	(-2.434)	(-2.673)	(-2.566)
Size	0.000	-0.003	0.005	-0.001	0.000	-0.004	-0.001
	(-0.025)	(-0.249)	(0.374)	(-0.053)	(-0.002)	(-0.338)	(-0.102)
PE house age	0.015	0.014	0.012	0.015	0.015	0.016	0.013
	(0.831)	(0.765)	(0.669)	(0.828)	(0.837)	(0.883)	(0.754)
Country and industry fixed effects	yes	yes	yes	yes	yes	yes	yes
Adj. R^2	0.107	0.124	0.114	0.107	0.113	0.110	0.125
N	3763	3763	3763	3763	3763	3763	3763

Table IA-IX

Cross-Sectional Analysis by Duration Quartiles

The table reports the output of OLS regressions. It repeats the analysis from Table VII on subsamples based on investment duration. Panel A shows the results for the subsample of investments that are held less than 2.5 years. Panel B shows the results for the subsample of investments that are held less than four years but more than 2.5 years. Panel C shows the results for the subsample of investments that are held less than six years but more than four years. Panel D shows the results for the sub-sample of investments that are held more than six years. Each explanatory variable is standardized by removing the sample average and dividing by the sample standard deviation. Standard errors are clustered at the investment year level and corresponding t-statistics are reported below each coefficient in parentheses. The variable "tightening of credit standards" is available starting in April 1990. Hence, the sample is restricted to investments initiated in April 1990 or later.

Panel A: Subsample of Short Investments (Held for Less than 2.5 years)								
P&S liquidity conditions	0.105		0.060	0.102	0.103	0.103	0.105	0.056
	(3.417)		(2.195)	(3.411)	(3.550)	(3.014)	(3.398)	(1.812)
Tightening of credit standards		-0.206	-0.173					-0.169
		(-4.451)	(-4.093)					(-3.349)
Industrial production growth				0.099				0.024
				(1.922)				(0.442)
Delta credit spread					-0.014			0.013
					(-0.570)			(0.481)
Relative number of M&A deals						-0.016		-0.036
						(-0.378)		(-0.693)
Delta realized long-term volatility							0.005	-0.008
							(0.139)	(-0.199)
Rm-Rf	0.062	-0.012	-0.016	0.003	0.060	0.069	0.061	-0.010
	(1.621)	(-0.318)	(-0.407)	(0.069)	(1.594)	(1.495)	(1.567)	(-0.184)
Growth investment	-0.077	-0.082	-0.078	-0.066	-0.077	-0.079	-0.078	-0.078
	(-1.780)	(-1.977)	(-1.900)	(-1.510)	(-1.767)	(-1.816)	(-1.905)	(-2.021)
Size	0.026	0.017	0.018	0.036	0.025	0.025	0.025	0.020
	(0.677)	(0.475)	(0.516)	(0.961)	(0.632)	(0.644)	(0.689)	(0.587)
PE house age	-0.006	-0.004	-0.005	-0.012	-0.006	-0.005	-0.006	-0.005
	(-0.217)	(-0.127)	(-0.184)	(-0.442)	(-0.213)	(-0.189)	(-0.217)	(-0.174)
Country and industry fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Adj. R^2	0.098	0.110	0.122	0.102	0.104	0.105	0.098	0.129
N	952	952	952	952	952	952	952	952

Table IA-IX: continued

Panel B: Subsample of Mid/Short Investments (Held for More than 2.5 Years and Less than Four Years)								
P&S liquidity conditions	0.151		-0.025	0.147	0.109	0.143	0.154	0.021
	(3.318)		(-0.465)	(3.096)	(2.241)	(1.923)	(3.449)	(0.316)
Tightening of credit standards		-0.203	-0.218					-0.226
		(-6.434)	(-4.287)					(-2.682)
Industrial production growth				0.021				-0.034
				(0.228)				(-0.488)
Delta credit spread					-0.098			-0.029
					(-2.444)			(-0.402)
Relative number of M&A deals						-0.007		0.076
						(-0.111)		(1.245)
Delta realized long term volatility							0.009	-0.045
							(0.187)	(-0.717)
Rm-Rf	0.081	-0.018	-0.019	0.063	0.069	0.088	0.077	-0.059
	(2.268)	(-0.511)	(-0.526)	(0.789)	(2.385)	(1.166)	(1.906)	(-0.622)
Growth investment	-0.033	-0.038	-0.038	-0.032	-0.036	-0.033	-0.033	-0.035
	(-1.352)	(-1.490)	(-1.488)	(-1.264)	(-1.503)	(-1.333)	(-1.357)	(-1.367)
Size	-0.008	-0.024	-0.026	-0.007	-0.013	-0.008	-0.009	-0.025
	(-0.346)	(-1.006)	(-1.063)	(-0.291)	(-0.575)	(-0.351)	(-0.372)	(-0.968)
PE house age	0.050	0.050	0.050	0.049	0.051	0.050	0.050	0.050
	(1.666)	(1.693)	(1.687)	(1.661)	(1.728)	(1.653)	(1.653)	(1.706)
Country and industry fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Adj. R^2	0.113	0.144	0.144	0.122	0.117	0.114	0.114	0.148
N	910	910	910	910	910	910	910	910

Table IA-IX: continued

Panel C: Subsample of Mid/Long Investments (Held for More than Four Years and Less than Six Years)								
P&S liquidity conditions	0.120		0.012	0.124	0.088	0.052	0.108	-0.002
	(4.903)		(0.271)	(4.879)	(2.779)	(1.629)	(3.866)	(-0.056)
Tightening of credit standards		-0.133	-0.125					-0.170
		(-5.262)	(-2.680)					(-2.455)
Industrial production growth				-0.052				-0.088
				(-0.840)				(-1.130)
Delta credit spread					-0.058			0.011
					(-1.723)			(0.227)
Relative number of M&A deals						-0.055		0.052
						(-2.347)		(0.779)
Delta realized long-term volatility							-0.015	-0.070
							(-0.415)	(-1.105)
Rm-Rf	0.021	-0.022	-0.023	0.075	0.029	0.090	0.031	0.036
	(0.829)	(-0.946)	(-1.008)	(0.984)	(1.212)	(2.258)	(1.111)	(0.852)
Growth investment	-0.023	-0.027	-0.027	-0.025	-0.026	-0.025	-0.023	-0.030
	(-0.787)	(-0.967)	(-0.968)	(-0.823)	(-0.896)	(-0.868)	(-0.801)	(-1.048)
Size	-0.002	-0.006	-0.006	-0.005	-0.005	-0.005	-0.002	-0.006
	(-0.231)	(-0.543)	(-0.537)	(-0.413)	(-0.478)	(-0.446)	(-0.187)	(-0.547)
PE house age	-0.004	-0.003	-0.003	-0.004	-0.004	-0.004	-0.004	-0.005
	(-0.202)	(-0.175)	(-0.176)	(-0.206)	(-0.180)	(-0.214)	(-0.217)	(-0.235)
Country and industry fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Adj. R^2	0.056	0.064	0.064	0.057	0.060	0.059	0.057	0.070
N	970	970	970	970	970	970	970	970

Table IA-IX: continued

Panel D: Subsample of Long Investments (Held for More than Six Years)								
P&S liquidity conditions	-0.020		-0.145	-0.020	-0.049	-0.046	-0.020	-0.128
	(-0.463)		(-3.789)	(-0.460)	(-0.966)	(-0.656)	(-0.421)	(-2.397)
Tightening of credit standards		-0.085	-0.169					-0.171
		(-3.906)	(-7.987)					(-4.871)
Industrial production growth				0.012				0.008
				(0.263)				(0.310)
Delta credit spread					-0.074			-0.022
					(-2.345)			(-0.644)
Relative number of M&A deals						-0.024		0.030
						(-0.628)		(0.641)
Delta realized long term volatility							0.000	-0.026
							(-0.009)	(-0.617)
Rm-Rf	0.129	0.036	0.081	0.115	0.128	0.152	0.129	0.037
	(2.561)	(1.410)	(2.253)	(1.711)	(2.604)	(2.133)	(2.715)	(0.576)
Growth investment	-0.010	-0.013	-0.011	-0.010	-0.010	-0.011	-0.010	-0.010
	(-0.974)	(-1.340)	(-1.187)	(-0.971)	(-0.985)	(-1.053)	(-0.976)	(-1.116)
Size	0.001	-0.001	-0.001	0.001	0.000	0.000	0.001	0.000
	(0.119)	(-0.125)	(-0.126)	(0.170)	(-0.082)	(0.029)	(0.120)	(0.052)
PE house age	0.002	0.006	0.007	0.002	0.004	0.003	0.002	0.006
	(0.442)	(0.976)	(1.180)	(0.416)	(0.672)	(0.532)	(0.441)	(1.158)
Country and industry fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Adj. R^2	0.051	0.060	0.069	0.054	0.056	0.051	0.051	0.071
N	931	931	931	931	931	931	931	931

Notes

[1]In principle, one should convert the estimated loadings from the logarithmic representation of returns to the representation in levels using equation (7). However, the difference between the two quantities is negligible. So, for simplicity, we use the estimates from the equation in logs.

[2]We use a 48 month measurement window for the factor realizations to match the average life of a private equity investment.

[3]Note also that the average conditional liquidity risk premium differs from the 3% estimate of the unconditional liquidity risk premium that we report in the main analysis. The fact that the mean of the conditional premium does not necessarily equal the product of the unconditional beta times the unconditional factor risk premium has been documented in the literature. The two quantities are different whenever the covariance between the conditional beta and the conditional factor risk premium is not zero (see, for example, Lewellen and Nagel (2006)).