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Is saving vital? Evidence from the financial crisis

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Abstract

We use a sample of 8,561 firm-years from the highly regulated Main Market (MAIN) and relatively unregulated Alternative Investment Market (AIM) in the United Kingdom to analyse the impact of financial restrictions on optimal cash holdings in the context of financial crises. Employing system generalised methods of moments, we find that AIM firms have a faster adjustment speed of cash as confirmed by precautionary and transaction motives over 2002-2017. However, AIM firms decrease (increase) their adjustment speed of cash more than MAIN firms during (after) the financial crises.

Keywords: adjustment speed; eurozone debt crisis; financial constraints; global financial crisis; market regulations
JEL Classification Codes: C26, G01, G38

1. Introduction

Cash holding is a strategically important decision especially when access to external funds is limited. When a financial crisis hit, firms that are far away from their target cash level face higher adjustment costs. These costs are exacerbated during distress times especially for younger firms. Since differences of market regulations in United Kingdom (UK) and recent financial crises (global financial crisis-GFC 2007-2009; Eurozone debt crisis-EDC 2010-2012) give us a natural experiment opportunity, we investigate the impact of financial constraints with the existence of financial crises on optimal cash holdings of UK firms for the period 2002-2017.

Based on optimal cash holdings, firms consider a trade-off between the benefits and costs of adjustment on cash holdings (Lozano and Duran 2017, Martinez-Sola et al 2018). Farinha et al. (2018) analyse the impact of earnings quality on cash holdings across the highly regulated Main Market (MAIN) and the less regulated Alternative Investment Market (AIM) in the UK. Due

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to strict requirements[1] to be listed in the MAIN, small and younger firms mostly list in the AIM. Thus, AIM firms may face problems accessing to external funding, whereas their MAIN counterparts have better access. Although many studies consider the role of financial constraints or financial crises on cash holdings (Song and Lee 2012; Chen et al. 2018), to the best of our knowledge, the impact of financial restrictions on optimal cash holdings in the context of financial crises is not examined before.

Our study differs from the literature by examining the impact of (i) financial constraints and (ii) financial crises on cash holdings as well as optimal cash holdings and (iii) proposing an alternative measure for financial constraints in the UK. Employing the partial adjustment model and system generalised methods of moments (GMM), we find that AIM firms have a faster speed of adjustment (SOA) of cash as confirmed by precautionary and transaction motive over the period 2001-2017. However, AIM firms decrease (increase) their adjustment speed of cash more than MAIN firms during (after) the financial crises.

2. Hypothesis Development

The optimal level of cash holding is determined by the trade-off between the marginal benefit and cost of holding an extra amount of cash (Ozkan and Ozkan 2004). Firms may target a different cash level based on different scenarios. For instance, firms may increase cash retention owing to rising costs of external financing when uncertainty arises; whereas they may choose to hold less cash in normal times. Hence, firms are not assumed to have a single target cash level and adjust their cash holdings to different target levels (Ozkan and Ozkan 2004).

Financially constrained or smaller firms have high cash balances that result with a faster SOA of cash implying precautionary and transaction motives as confirmed by recent research. Martinez-Sola et al. (2018) show that smaller Spanish firms have a quicker SOA of cash than larger firms. Also, Lozano and Duran (2017) find that family-controlled firms are more aggressive in adjusting their cash level compared to non-family owned firms, which implies that family firms can achieve optimal cash level faster. Considering that, AIM firms behave similar to smaller or financially constrained firms, we conjecture our first hypothesis:

Hypothesis 1: The speed of adjustment of cash holdings is greater for AIM firms than MAIN firms over the entire period.

During the financial market turmoil, smaller or financially constrained firms burn more cash to overcome financial difficulties. Thus, they decrease their cash level more than larger or financially unconstrained firms. Duchin et al. (2010) confirm the drop in cash holdings for US firms during the GFC. The decline in cash level results with the drop in SOA of cash; hence, we state our second hypothesis:

Hypothesis 2: The speed at which AIM firms adjusts to target cash holdings decreases more than MAIN firms during the financial crises.

After the turbulence, firms tend to hoard cash (Martinez-Sola et al. 2018). Notably, financially constrained or smaller firms sharply increase their cash level just after the financial crises; thus, they hold more cash compared to financially unconstrained or larger firms as supported by precautionary and transaction motives. Furthermore, Stone and Gup (2019) mention that US firms hoard more cash after the global financial crisis 2007-2009. Since the rise in cash holdings implies an increase in SOA of cash, we formulate our third hypothesis:

Hypothesis 3: The speed at which AIM firms adjusts to target cash holdings increases more than MAIN firms after the financial crises.

[1] We present the comparison of admission requirements across the AIM and MAIN in Table A3 (Appendix A).

3. Methodology

Employing dynamic panel data model, we use the partial adjustment model[2] on optimal cash holdings in line with the literature (Ozkan and Ozkan 2004; Bates et al. 2018).

The basic partial adjustment model of cash holdings is stated below:

$$CASH_{i,t} - CASH_{i,t-1} = \lambda_i (CASH_{i,t}^{*} - CASH_{i,t-1}) + \varepsilon_{i,t} \quad (1)$$

where $CASH_{i,t}$ is the cash ratio of firm i in year t, λ_i is the adjustment parameter and ε_{it} is the time-varying disturbance term.

$$CASH_{i,t}^{*} = \beta X_{i,t-1} \quad (2)$$

where $CASH_{i,t}^{*}$ is a target cash ratio, β is a coefficient vector and $X_{i,t-1}$ is a vector of firm characteristics considering the costs and benefits of cash holdings at time $t-1$.

We substitute and rearrange Equations 1 and 2. The dynamic partial adjustment cash model is as follows:

$$CASH_{i,t} = (1 - \lambda_i) CASH_{i,t-1} + (\lambda\beta) X_{i,t-1} + \alpha_i F_i + \alpha_t Y_t + \varepsilon_{i,t} \quad (3)$$

where λ is the adjustment speed.

We test our hypotheses using the full dynamic partial adjustment model of cash below:

$$CASH_{ij,t} = (1 - \lambda_{ij}) CASH_{ij,t-1} + (\lambda_j\beta_j)[SIZE+GROW+VOL+INV+DIV+LEV+NWC+CFLOW+R\&D]_{i,t-1} + \alpha_{ij} F_i + \alpha_t Y_t + \varepsilon_{ij,t} \quad (4)$$

where $CASH_{i,t}$ and $CASH_{i,t-1}$ are cash and short-term investments to total assets for firm i at time t and $t-1$, respectively. Nine control explanatory variables[3] included. $SIZE_{i,t-1}$ is lagged firm size, $GROW_{i,t-1}$ is lagged growth, $VOL_{i,t-1}$ is lagged cash flow volatility, $INV_{i,t-1}$ is lagged investment, $DIV_{i,t-1}$ is lagged dividends, $LEV_{i,t-1}$ is lagged leverage, $NWC_{i,t-1}$ is lagged net working capital, $CFLOW_{i,t-1}$ is lagged cash flow, $R\&D_{i,t-1}$ is lagged R&D expenses, F_i and Y_t are firm- and year-fixed effects respectively controlling for unobservable factors which affect the cash ratio and $\varepsilon_{i,t}$ is the error term.

Regarding the estimation of dynamic partial adjustment of cash holdings, the empirical literature commonly employs the difference or system GMM (Bates et al. 2018). The difference GMM uses the lagged versions of dependent and explanatory variables as instruments but faces weak instruments problem. However, the system GMM of Blundell and Bond (1998) adds moment conditions to enhance the efficiency of difference GMM and reduce the finite sample bias. Therefore, we employ system GMM to test our hypotheses in line with recent research (Lozano and Duran 2017; Bates et al. 2018).

4. Data

We retrieve our sample from Worldscope in DataStream over the period 2002-2017 that results with 8,561 firm-year observations and 882 non-financial firms in the UK, including 449 MAIN and 433 AIM firms. We construct our sample as follows. First, we eliminate financial and utility firms that intend to increase their cash reserves (Bates et al. 2018).

[2] Regarding adjustment models, DeAngelo and Roll (2015: 376) compare the three forms of capital structure targeting: (i) target zones, (ii) the speed of adjustments and (iii) no targeting. They claim that there is no best model (2015: 408).

[3] We estimate our models using the lagged one year of explanatory variables in order to reduce any simultaneity bias in dynamic panel analyses.

Next, we divide our sample as pre-crisis[4] (2002-2006), crises (2007-2012) and post-crisis (2013-2017) to understand the impact of the GFC[5] and EDC[6] on optimal cash holdings. We follow Coldbeck and Ozkan (2018) by keeping the firms that have observations at least four consecutive years for each subperiod to have the conditions of a dynamic panel model. Thus, firms in our sample have 4 to 16 years of consecutive observations. Finally, we winsorise all continuous variables at 1% and 99% to eliminate the outlier effect in our sample (De Marco 2019).

Table 1. Data Definitions.

Variables	Variable Definitions	Worldscope Code
CASH	Cash and short-term investments / Total assets	WC02001 / WC02999
L.CASH	Lagged CASH	Lagged [WC02001 / WC02999]
L.SIZE	The log of total assets year by year	Ln [WC02999]
L.GROW	[Total assets – Book value of equity + Market value of equity] / Total assets	[WC02999 – WC03501 + WC08001] / WC02999
L.VOL	The standard deviation of cash flow of each firm for last 5 years	SD [L.CFLOWt:t-5]
L.INV	Capital expenditures / Total assets	WC04601 / WC02999
L.DIV	Cash dividends paid / Total assets	WC04551 / WC02999
L.LEV	Total debt / Total assets	WC03255 / WC02999
L.NWC	[Current assets – Current liabilities – Cash and short-term investments] / Total assets	[WC02201 – WC03101 – WC02001] / WC02999
L.CFLOW	[Pre-tax income + Depreciation] / Total assets	[WC01401 + WC01151] / WC02999
L.R&D	The dummy variable equals to one for the R&D investing firms in current year, otherwise zero including missing values	WC01201 (R&D Expense)
PRE	Dummy variable is one for the years of 2002-2006, otherwise zero	
CRISES	Dummy variable is one for the years of 2007-2012, otherwise zero	
POST	Dummy variable is one for the years of 2013-2017, otherwise zero	

We define all variables, its sources and periods in Table 1. Also, we present descriptive statistics and correlation matrices for the periods: ENTIRE (2002-2017), PRE (2002-2006), CRISES (2007-2012) and POST (2013-2017) in Tables A1 and A2 (Appendix A), respectively. We report the variance inflation factor (VIF) which measures the multicollinearity across explanatory variables. We note that our whole sample and subsamples do not suffer from multicollinearity[7].

We use the market differences as an alternative measure for financial constraints. Means of variables, as presented in Table 2 below, show whether the market classification of UK firms is consistent with the common financial constraint measures such as firm size and dividend payments. AIM firms are smaller and pay less dividends, in addition they have higher cash, growth opportunities, volatility and lower capital expenditures, leverage, net working capital and cash flow compared to their MAIN counterparts. These differences across two exchanges confirm that the market differences in the UK may be acceptable as an indicator of financial constraint.

[4] Our sample period starts in 2002 to eliminate the effect of Dot-com crisis and the subsequent turbulence (Dang et al. 2014: 232). Also, we have a five year window to examine optimal cash decisions before and after the financial uncertainties.

[5] We describe the GFC period 2007-2009 as stated by Kahle and Stulz (2013) and Stone and Gup (2019).

[6] We follow De Marco (2019) who defines the EDC period as 2010-2012.

[7] Freund et al. (2006) specify that the VIF values should be smaller than 10 not to face any multicollinearity problem. In Table A2 (Appendix A), we report the maximum VIF with 3.11; that is why our sample does not suffer from multicollinearity issue.

Table 2. Means of Variables across the MAIN and AIM over 2002-2017.

	CASH	L.SIZE	L.GROW	L.VOL	L.INV	L.DIV	L.LEV	L.NWC	L.CFLOW	L.R&D
MAIN	0.140	12.705	1.879	0.064	0.050	0.027	0.203	-0.017	-0.048	0.353
AIM	0.198	10.182	2.147	0.090	0.041	0.013	0.141	-0.145	-0.198	0.363

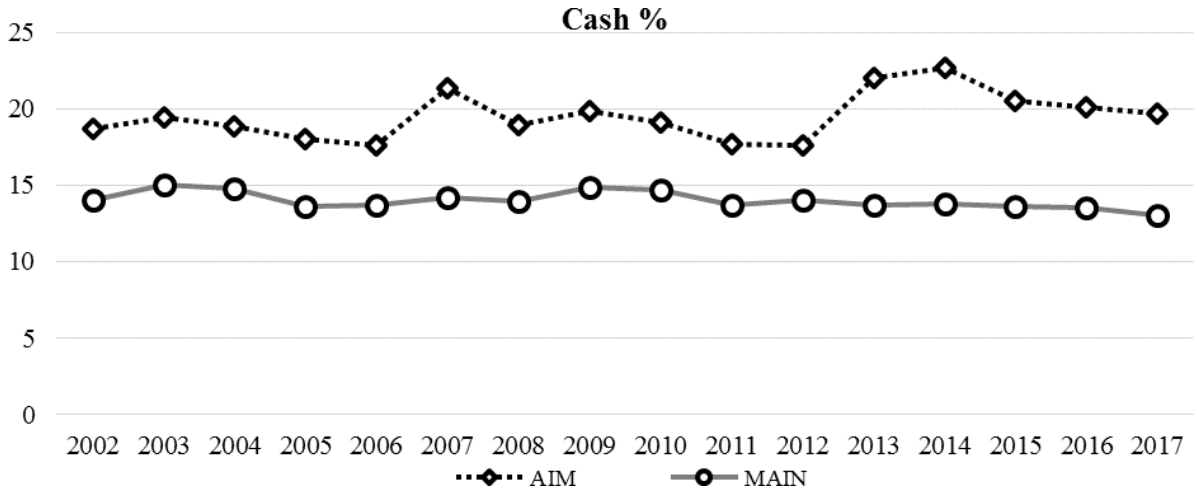
Source: Worldscope.

5. Empirical Results

5.1. Cash Holdings and the Financial Crises

Figure 1 shows the variation on cash holdings across the AIM and MAIN for the period 2002-2017. Since AIM firms are smaller and younger (financially constrained), they accumulate more cash in line with the precautionary and transaction motives. During the periods of crises between 2007 and 2012, AIM firms decrease their cash level more than MAIN firms. After the EDC, MAIN firms decline its cash level systematically. However, AIM firms rise their cash level about 5% just after 2012 and then drop[8] their cash level. Overall, while the cash level of AIM firms fluctuates more, those of MAIN firms slightly change. Thus, MAIN firms prefer borrowing instead of hoarding cash owing to the corporation tax advantage of debt, but AIM firms have difficulties accessing external finance contrary to their MAIN counterparts.

Figure 1. Cash Means across the MAIN and AIM over 2002-2017.



Notes: Figure 1 presents the variation on mean cash ratios for the period 2002-2017 across the AIM and MAIN. *Source*: Worldscope.

5.2. Optimal Cash Holdings and the Financial Crises

Since the adjustment speed of corporate decisions varies by institutional settings and time (Coldbeck and Ozkan 2018), the partial dynamic adjustment model is a better fit. Consequently, we employ the partial adjustment model on cash holdings by estimating with the system GMM. In order to examine the role of (i) financial constraints and (ii) financial crises on optimal cash holdings, we divide our sample as (i) AIM and MAIN and (ii) PRE (2002-2006), CRISES (2007-2012) and POST (2013-2017). Thus, we clearly understand the variation on adjustment speed of cash holdings across markets and periods.

Table 3 presents the results and summary of hypothesis testing by Panel A and Panel B, respectively. In columns 1 and 2, we investigate whether AIM firms have a higher adjustment speed of cash than MAIN firms (*Hypothesis 1*). AIM firms close the gap between actual- and

[8] AIM firms decrease their cash level similar to their MAIN counterparts in normal times due to the cost of carry of cash (Martinez-Sola et al. 2018).

target-cash 5.3% faster than MAIN firms over the entire period 2002-2017; thus, we do not reject *Hypothesis 1*. Also, the results are similar in periods PRE and POST. Notably, AIM firms have 9.0% and 8.5% faster adjustment speed of cash than MAIN firms before and after the turbulence, respectively. Again, we do not reject *Hypothesis 1*. Our findings are supported by precautionary and transaction motives in line with the empirical literature (Lozano and Duran 2017; Martinez-Sola et al. 2018).

Table 3. Optimal Cash Holdings across the MAIN and AIM across Periods.

Panel A. Results of Hypothesis Testing

	Dependent variable: CASH							
	ENTIRE 2002-2017		**PRE** 2002-2006		**CRISES** 2007-2012		**POST** 2013-2017	
	MAIN	*AIM*	*MAIN*	*AIM*	*MAIN*	*AIM*	*MAIN*	*AIM*
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
L.CASH	0.633***	0.580***	0.606***	0.516***	0.592***	0.641***	0.624***	0.539***
	(0.033)	(0.039)	(0.077)	(0.122)	(0.039)	(0.050)	(0.068)	(0.052)
L.SIZE	-0.003*	-0.013***	-0.002	-0.002	-0.005*	-0.008*	-0.008*	-0.026***
	(0.002)	(0.004)	(0.004)	(0.008)	(0.003)	(0.006)	(0.004)	(0.007)
L.GROW	0.004*	0.008	0.004	0.012*	0.004	0.006	0.002**	0.006**
	(0.001)	(0.003)	(0.001)	(0.004)	(0.001)	(0.003)	(0.001)	(0.003)
L.VOL	0.119***	0.023	0.120*	0.091	0.113	-0.009	0.120	0.066
	(0.045)	(0.046)	(0.074)	(0.110)	(0.065)	(0.065)	(0.086)	(0.072)
L.INV	-0.062	0.146**	-0.054	0.341**	-0.030	-0.081	-0.249	-0.064
	(0.050)	(0.079)	(0.058)	(0.151)	(0.065)	(0.063)	(0.118)	(0.088)
L.DIV	-0.008	0.226**	0.134	0.080	-0.037	-0.247	-0.068	0.398***
	(0.051)	(0.093)	(0.105)	(0.113)	(0.076)	(0.184)	(0.074)	(0.115)
L.LEV	-0.044**	-0.062	-0.067*	-0.056	-0.039	-0.008	0.001***	-0.114**
	(0.020)	(0.032)	(0.041)	(0.051)	(0.026)	(0.046)	(0.054)	(0.047)
L.NWC	0.004	0.016	0.024	0.053	0.001	0.028*	0.000	0.015
	(0.025)	(0.022)	(0.039)	(0.045)	(0.032)	(0.030)	(0.049)	(0.042)
L.CFLOW	-0.048**	-0.049**	-0.046	-0.045	-0.047*	-0.029	-0.080***	-0.075**
	(0.021)	(0.022)	(0.039)	(0.043)	(0.023)	(0.025)	(0.031)	(0.033)
L.R&D	0.015*	0.022**	-0.002	0.042*	0.042***	0.019	0.007	0.006
	(0.009)	(0.011)	(0.015)	(0.025)	(0.015)	(0.017)	(0.015)	(0.018)
Constant	0.079***	0.162***	0.063	0.055	0.085**	0.105*	0.145**	0.326***
	(0.030)	(0.044)	(0.0)	(0.090)	(0.044)	(0.069)	(0.058)	(0.081)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# of instruments	486	488	145	145	186	186	155	155
AR (2)	0.312	0.590	0.189	0.122	0.124	0.689	0.199	0.851
Hansen test	0.902	0.986	0.732	0.290	0.258	0.296	0.156	0.732
# of firms	449	433	292	170	414	351	334	389
# of N	4,866	3,695	1,331	660	2,054	1,478	1,481	1,551

Panel B. Summary of Hypothesis Testing

	ENTIRE	**PRE**	**CRISES**	**POST**	**CRISES − PRE**	**POST − CRISES**
AIM	42.0%	48.4%	35.9%	46.1%	-12.5%	10.2%
MAIN	36.7%	39.4%	40.8%	37.6%	1.4%	-3.2%
AIM vs. MAIN	**5.3%[H1]**	**9.0%**	**-5.1%**	**8.5%**	**-13.9% [H2]**	**13.4% [H3]**

Notes: Table 3 presents the cash holding adjustments' results and summary of hypothesis testing by Panel A and Panel B, respectively for periods ENTIRE (2002-2017), PRE (2002-2006), CRISES (2007-2012) and POST (2013-2017) across AIM and MAIN. Adjustment speeds (SOA) are calculated as "SOA = 1− the coefficient for lagged cash." The definitions of all variables are presented in Table 1. AR (2) test is for the null of no residual serial correlation and Hansen test is the value of GMM function on parameter estimation. We report the p-values for AR(2) and Hansen tests which reject the null hypothesis, GMM estimation gives reliable results. ***, **, and * indicate a significant difference between groups at the 1%, 5%, and 10% significance level, respectively.

Next, we analyse the variation on SOA of cash between PRE 2002-2006 (columns 3 and 4) and CRISES 2007-2012 (columns 5 and 6). Therefore, we test whether AIM firms decrease their SOA of cash more than MAIN firms during the financial market turmoil (*Hypothesis 2*). AIM (MAIN) firms decrease (increase) their SOA of cash by 12.5% (1.4%). Therefore, AIM firms drop their SOA of cash 13.9% more compared to MAIN firms during the financial crises. We do not reject *Hypothesis 2*. AIM firms have slower SOA of cash during the financial crises.

Since AIM firms are financially constrained and smaller, they consume their cash stocks more than their MAIN counterparts in the time of turbulence.

Last, the picture changes again from CRISES 2007-2012 (columns 5 and 6) to POST 2013-2017 (columns 7 and 8) period. The SOA of cash in POST is slower than in PRE. In particular, we examine whether the SOA of cash peaks for AIM firms more than MAIN firms after the financial crises (*Hypothesis 3*). AIM firms and MAIN firms rise and drop the SOA of cash by 10.2% and 3.2%, respectively in the aftermath of the GFC and EDC. Since AIM firms increase their SOA of cash 13.4% more than MAIN firms, we do not reject *Hypothesis 3*. The results in POST are similar in PRE and ENTIRE, therefore, both precautionary motive and transaction motive work for our sub-samples and the whole sample. Overall, financial restrictions and financial crises have a significant role in optimal cash holdings.

5.3. Robustness Checks

We repeat our regression analyses scaling all related variables by net assets, which is described as total assets minus cash and short-term investments. We do not report the robustness results for brevity, but they are qualitatively similar to main results and do not reject all three hypotheses. Thus, the measure of cash is not sensitive to the optimal cash calculation.

6. Conclusions

We investigate the impact of financial constraints with the existence of financial crises on optimal cash holdings of 882 non-financial UK firms for the period 2002-2017. Utilising the dynamic partial adjustment model and system GMM, we find that AIM firms-financially constrained or small firms-have a faster adjustment speed of cash than MAIN firms in line with precautionary motive and transaction motive for the periods of ENTIRE (2002-2017), PRE (2002-2006) and POST (2013-2017). However, this picture changes during the period of CRISES (2007-2012). AIM firms decrease their adjustment speed of cash more than MAIN firms during the financial market turmoil.

We contribute to the literature by analysing the role of financial constraints and financial crises on the optimal cash holding behaviour of UK firms across sub-samples. When financial uncertainties emerge, firms' optimal cash decisions change depending on which market they are listed in. Notably, we use the located place of exchange as a financial constraint measure for UK firms. Taking together all results, investors and practitioners should consider the conditions of market regulation for firms and the possibility of financial turmoil to understand whether saving is crucial for that firm on a rainy day.

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Appendix A – Additional tables

Table A1. Descriptive Statistics across the MAIN and AIM.

Panel A. ENTIRE		**CASH**	**L.CASH**	**L.SIZE**	**L.GROW**	**L.VOL**	**L.INV**	**L.DIV**	**L.LEV**	**L.NWC**	**L.CFLOW**	**L.R&D**
(1) ***MAIN***	N	6,113	6,001	6,002	6,002	4,924	5,962	5,969	5,970	5,978	5,971	6,002
	Mean	0.141	0.141	12.719	1.868	0.064	0.049	0.027	0.203	-0.018	-0.050	0.351
	SD	0.153	0.154	2.353	1.542	0.063	0.060	0.038	0.179	0.205	0.214	0.477
	Min	0.000	0.000	5.529	0.263	0.000	0.000	0.000	0.000	-1.856	-0.929	0.000
	Median	0.089	0.089	12.777	1.445	0.044	0.031	0.018	0.180	-0.019	0.007	0.000
	Max	1.000	0.996	19.968	17.117	0.532	0.764	0.429	0.906	0.845	0.494	1.000
(2) ***AIM***	N	5,724	5,525	5,527	5,527	3,805	5,473	5,513	5,464	5,472	5,487	5,527
	Mean	0.198	0.200	10.188	2.140	0.095	0.040	0.013	0.142	-0.016	-0.198	0.364
	SD	0.210	0.213	1.822	2.178	0.084	0.061	0.030	0.178	0.231	0.297	0.481
	Min	0.000	0.000	5.472	0.263	0.000	0.000	0.000	0.000	-1.856	-0.929	0.000
	Median	0.122	0.123	10.131	1.408	0.065	0.020	0.000	0.078	-0.001	-0.092	0.000
	Max	0.990	0.990	19.008	17.117	0.504	0.748	0.429	0.906	0.771	0.494	1.000
Panel B. PRE												
(3) ***MAIN***	N	1,626	1,599	1,599	1,599	1,332	1,599	1,599	1,599	1,595	1,594	1,599
	Mean	0.143	0.142	12.364	1.946	0.069	0.055	0.026	0.196	-0.006	-0.047	0.378
	SD	0.155	0.155	2.266	1.674	0.067	0.065	0.030	0.177	0.189	0.215	0.485
	Min	0.000	0.000	6.054	0.456	0.001	0.000	0.000	0.000	-1.076	-0.929	0.000
	Median	0.095	0.092	12.220	1.484	0.045	0.037	0.019	0.169	-0.015	0.015	0.000
	Max	0.890	0.890	19.008	16.326	0.401	0.710	0.401	0.848	0.760	0.349	1.000
(4) ***AIM***	N	1,086	1,048	1,048	1,048	671	1,048	1,048	1,048	1,028	1,048	1,048
	Mean	0.185	0.191	9.804	2.312	0.096	0.040	0.012	0.155	0.005	-0.201	0.376
	SD	0.207	0.215	1.779	2.522	0.088	0.058	0.021	0.182	0.229	0.311	0.485
	Min	0.000	0.000	6.054	0.456	0.002	0.000	0.000	0.000	-1.076	-0.929	0.000
	Median	0.110	0.112	9.656	1.412	0.063	0.024	0.000	0.101	0.012	-0.094	0.000
	Max	0.961	0.961	16.035	16.326	0.504	0.710	0.198	0.848	0.724	0.349	1.000
Panel C. CRISES												
(5) ***MAIN***	N	2742	2,687	2,687	2,687	2,064	2,667	2,664	2,687	2,671	2,682	2,687
	Mean	0.143	0.145	12.484	1.763	0.067	0.048	0.024	0.204	-0.028	-0.057	0.357
	SD	0.156	0.159	2.384	1.380	0.063	0.061	0.038	0.182	0.209	0.221	0.479
	Min	0.000	0.000	5.529	0.263	0.001	0.000	0.000	0.000	-1.856	-0.895	0.000
	Median	0.087	0.088	12.550	1.382	0.048	0.027	0.014	0.180	-0.027	0.005	0.000
	Max	0.989	0.989	19.450	14.271	0.532	0.764	0.429	0.854	0.845	0.494	1.000
(6) ***AIM***	N	2,413	2,344	2,344	2,344	1,497	2,338	2,337	2,343	2,317	2,336	2,344
	Mean	0.191	0.197	10.073	2.005	0.104	0.039	0.012	0.141	-0.022	-0.191	0.374
	SD	0.208	0.212	1.818	1.969	0.089	0.061	0.029	0.177	0.242	0.292	0.484
	Min	0.000	0.000	5.472	0.263	0.000	0.000	0.000	0.000	-1.856	-0.895	0.000
	Median	0.117	0.122	10.004	1.327	0.073	0.018	0.000	0.075	-0.004	-0.090	0.000
	Max	0.990	0.990	18.133	14.271	0.468	0.748	0.429	0.854	0.668	0.494	1.000
Panel D. POST												
(7) ***MAIN***	N	1,745	1,715	1,716	1,716	1,528	1,696	1,706	1,684	1,712	1,695	1,716
	Mean	0.136	0.136	13.418	1.961	0.056	0.046	0.031	0.210	-0.013	-0.041	0.317
	SD	0.144	0.145	2.234	1.641	0.057	0.054	0.045	0.176	0.214	0.202	0.465
	Min	0.000	0.000	5.940	0.394	0.000	0.000	0.000	0.000	-1.350	-0.872	0.000
	Median	0.089	0.087	13.441	1.533	0.038	0.028	0.021	0.196	-0.012	0.004	0.000
	Max	1.000	0.996	19.968	17.117	0.494	0.602	0.379	0.906	0.817	0.397	1.000
(8) ***AIM***	N	2,225	2,133	2,135	2,135	1,637	2,087	2,128	2,073	2,127	2,103	2,135
	Mean	0.211	0.207	10.503	2.204	0.085	0.041	0.015	0.135	-0.020	-0.203	0.348
	SD	0.212	0.211	1.798	2.206	0.077	0.062	0.033	0.175	0.220	0.295	0.476
	Min	0.000	0.000	5.940	0.309	0.000	0.000	0.000	0.000	-1.350	-0.872	0.000
	Median	0.131	0.127	10.407	1.533	0.059	0.020	0.000	0.069	-0.004	-0.093	0.000
	Max	0.968	0.968	19.008	17.117	0.448	0.601	0.379	0.906	0.771	0.397	1.000

Notes: Table A1 presents the descriptive statistics for the periods: ENTIRE 2002-2017 (Panel A), PRE 2002-2006 (Panel B), CRISES 2007-2012 (Panel C) and POST 2013-2017 (Panel D) across MAIN and AIM. Variables defined in Table 1.

Table A2. Correlation Matrices across the MAIN and AIM.

	VIF	**CASH** $_t$	**[1]**	**[2]**	**[3]**	**[4]**	**[5]**	**[6]**	**[7]**	**[8]**	**[9]**
Panel A. ENTIRE											
MAIN											
[1] L.CASH	2.63	0.827									
[2] L.SIZE	1.28	-0.273	-0.267								
[3] L.GROW	1.29	0.203	0.224	-0.138							
[4] L.VOL	1.21	0.274	0.270	-0.280	0.104						
[5] L.INV	1.08	-0.076	-0.073	0.066	0.018	-0.017					
[6] L.DIV	1.36	-0.012	0.009	0.070	0.349	-0.113	0.032				
[7] L.LEV	1.34	-0.282	-0.295	0.279	-0.001	-0.062	0.108	-0.063			
[8] L.NWC	1.22	-0.149	-0.174	-0.065	-0.179	-0.136	-0.081	-0.027	-0.253		
[9] L.CFLOW	2.83	-0.628	-0.706	0.307	-0.027	-0.351	0.184	0.291	0.103	0.191	
[10] L.R&D	1.04	0.081	0.086	0.035	0.062	-0.010	-0.084	0.017	-0.087	0.086	-0.048

Table A2. Correlation Matrices across the MAIN and AIM (cont).

	VIF	$CASH_t$	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
AIM											
[1] L.CASH	2.38	0.814									
[2] L.SIZE	1.38	-0.286	-0.286								
[3] L.GROW	1.33	0.347	0.326	-0.295							
[4] L.VOL	1.19	0.147	0.157	-0.338	0.092						
[5] L.INV	1.03	-0.038	-0.063	0.083	0.068	-0.036					
[6] L.DIV	1.19	0.012	0.023	0.181	0.029	-0.200	0.027				
[7] L.LEV	1.36	-0.275	-0.323	0.044	0.106	-0.011	0.079	-0.095			
[8] L.NWC	1.32	-0.055	-0.052	0.135	-0.250	-0.156	-0.071	0.142	-0.352		
[9] L.CFLOW	2.57	-0.615	-0.691	0.430	-0.366	-0.268	0.058	0.236	0.104	0.230	
[10] L.R&D	1.10	0.218	0.218	-0.138	0.153	0.022	-0.097	-0.011	-0.050	0.095	-0.204
Panel B. PRE											
MAIN											
[1] L.CASH	2.53	0.818									
[2] L.SIZE	1.30	-0.269	-0.270								
[3] L.GROW	1.18	0.211	0.240	-0.106							
[4] L.VOL	1.29	0.298	0.281	-0.311	0.132						
[5] L.INV	1.08	-0.086	-0.108	0.067	0.011	-0.076					
[6] L.DIV	1.23	-0.012	0.030	0.072	0.200	-0.155	0.100				
[7] L.LEV	1.36	-0.317	-0.320	0.299	0.062	-0.111	0.132	-0.037			
[8] L.NWC	1.25	-0.135	-0.159	-0.110	-0.168	-0.129	-0.116	-0.038	-0.256		
[9] L.CFLOW	2.70	-0.626	-0.702	0.312	-0.096	-0.401	0.192	0.248	0.156	0.170	
[10] L.R&D	1.08	0.107	0.110	0.028	0.042	0.052	-0.121	0.020	-0.077	0.118	-0.154
AIM											
[1] L.CASH	2.30	0.771									
[2] L.SIZE	1.49	-0.272	-0.284								
[3] L.GROW	1.42	0.288	0.264	-0.360							
[4] L.VOL	1.41	0.183	0.224	-0.441	0.270						
[5] L.INV	1.14	-0.041	-0.127	0.105	0.117	-0.138					
[6] L.DIV	1.32	-0.122	-0.087	0.275	-0.093	-0.321	0.144				
[7] L.LEV	1.38	-0.314	-0.364	0.069	0.089	-0.016	0.051	-0.086			
[8] L.NWC	1.54	-0.047	-0.042	0.161	-0.356	-0.273	-0.147	0.232	-0.330		
[9] L.CFLOW	2.69	-0.593	-0.672	0.429	-0.378	-0.337	0.141	0.359	0.104	0.292	
[10] L.R&D	1.16	0.258	0.258	-0.136	0.084	0.023	-0.151	-0.025	-0.060	0.132	-0.260
Panel C. CRISES											
MAIN											
[1] L.CASH	2.72	0.840									
[2] L.SIZE	1.35	-0.296	-0.286								
[3] L.GROW	1.30	0.249	0.280	-0.172							
[4] L.VOL	1.22	0.250	0.272	-0.322	0.200						
[5] L.INV	1.12	-0.075	-0.059	0.103	0.013	-0.027					
[6] L.DIV	1.28	-0.038	-0.014	0.111	0.251	-0.106	0.028				
[7] L.LEV	1.34	-0.280	-0.314	0.247	0.028	-0.038	0.081	-0.025			
[8] L.NWC	1.25	-0.148	-0.168	-0.013	-0.251	-0.168	-0.087	-0.003	-0.254		
[9] L.CFLOW	2.95	-0.641	-0.713	0.377	-0.140	-0.311	0.222	0.285	0.126	0.214	
[10] L.R&D	1.05	0.092	0.094	0.035	0.080	-0.019	-0.099	0.018	-0.103	0.082	-0.016
AIM											
[1] L.CASH	2.27	0.816									
[2] L.SIZE	1.41	-0.271	-0.287								
[3] L.GROW	1.31	0.322	0.329	-0.315							
[4] L.VOL	1.17	0.120	0.138	-0.343	0.088						
[5] L.INV	1.03	-0.004	-0.009	0.103	0.037	-0.018					
[6] L.DIV	1.13	0.020	0.027	0.174	-0.024	-0.155	0.056				
[7] L.LEV	1.41	-0.241	-0.308	0.042	0.104	0.001	0.019	-0.083			
[8] L.NWC	1.36	-0.028	-0.043	0.143	-0.222	-0.129	-0.026	0.153	-0.401		
[9] L.CFLOW	2.41	-0.595	-0.685	0.428	-0.373	-0.248	0.065	0.199	0.122	0.199	
[10] L.R&D	1.13	0.229	0.236	-0.186	0.180	0.072	-0.087	-0.001	-0.023	0.095	-0.218
Panel D. POST											
MAIN											
[1] L.CASH	2.68	0.814									
[2] L.SIZE	1.22	-0.249	-0.246								
[3] L.GROW	1.32	0.122	0.102	-0.124							
[4] L.VOL	1.20	0.296	0.263	-0.127	-0.016						
[5] L.INV	1.06	-0.070	-0.057	0.041	-0.002	0.059					
[6] L.DIV	1.55	0.023	0.028	0.013	0.451	-0.085	-0.002				
[7] L.LEV	1.36	-0.256	-0.249	0.313	-0.087	-0.045	0.132	-0.128			
[8] L.NWC	1.20	-0.162	-0.194	-0.103	-0.117	-0.100	-0.048	-0.050	-0.250		
[9] L.CFLOW	3.11	-0.613	-0.702	0.226	0.132	-0.379	0.121	0.332	0.028	0.175	
[10] L.R&D	1.03	0.041	0.054	0.077	-0.011	-0.083	-0.033	0.025	-0.069	0.061	0.000
AIM											
[1] L.CASH	2.54	0.826									
[2] L.SIZE	1.34	-0.323	-0.298								
[3] L.GROW	1.29	0.333	0.284	-0.253							
[4] L.VOL	1.16	0.177	0.160	-0.268	0.034						
[5] L.INV	1.04	-0.065	-0.085	0.053	0.083	-0.002					
[6] L.DIV	1.23	0.042	0.053	0.158	0.064	-0.204	-0.035				
[7] L.LEV	1.36	-0.288	-0.316	0.045	0.151	-0.032	0.147	-0.113			
[8] L.NWC	1.25	-0.078	-0.055	0.126	-0.234	-0.138	-0.089	0.105	-0.321		
[9] L.CFLOW	2.80	-0.636	-0.700	0.455	-0.317	-0.279	0.014	0.236	0.077	0.228	
[10] L.R&D	1.08	0.197	0.189	-0.088	0.129	-0.043	-0.083	-0.012	-0.075	0.079	-0.174

Notes: Table A2 presents the correlation matrix for the periods: ENTIRE (Panel A), PRE (Panel B), CRISES (Panel C) and POST (Panel D) across MAIN and AIM by examining the variance inflation factor (VIF) across explanatory variables. Variables defined in Table 1.

Table A3. Comparison of Institutional Settings of UK Firms across the Market Differences.

Panel A. Main Market (MAIN)	**Panel B. Alternative Investment Market (AIM)**
− Minimum 25% shares in public hands	− No minimum shares in public hands
− Normally 3-year trading record required	− No trading record requirement
− Pre-vetting of admission documents by the UKLA or another recognised EU authority	− Admission documents not pre-vetted by Exchange or any listing authority
− Admission takes several months	− Admission can be achieved within 2 weeks
− Minimum market capitalisation on entry (£700K)	− No minimum market capitalisation
− Sliding scale admission fees: e.g., £16K, £49K, £142K respectively for £10m, £100m and £1bn market cap at issue	− Flat rate admission fee: £4K
	− Nominated adviser required at all times

Notes: Table A3 compares the differences of admission requirements across the Main market (MAIN) in Panel A and Alternative investment market (AIM) in Panel B. *Source:* London Stock Exchange and Gerakos et al. (2013: 213)