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Full Length Article

Do market differences matter on dividend policy?

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Abstract

We investigate the dividend policies of firms in the United Kingdom to understand whether firms in different markets use dividends as a signaling or disciplining device. The sample consists of 1247 firms from the highly regulated Main Market (MAIN) and relatively unregulated Alternative Investment Market (AIM) for the period 2002–2017. We find that firms in AIM pay lower dividends than their MAIN counterparts. However, during turbulence, AIM firms decrease dividends lower than MAIN firms. In line with the signaling hypothesis, AIM firms with increased profitability are more likely to increase dividends. These results suggest that AIM firms depend more on the signaling feature of the dividends, whereas MAIN firms use dividends as a disciplining device to limit managerial discretion. Specifically, we find that AIM firms facing bigger agency problems pay lower dividends compared to other AIM firms, in line with the outcome view of agency theory.

JEL classification: G01; G35

Keywords: Alternative investment market; Dividend policy; Financial crisis

1. Introduction

Dividend policy is relevant for firms since information asymmetry problems and, agency conflicts constitute market imperfections, implying that Miller and Modigliani (1961) irrelevance results do not hold. Corporations pay dividends strategically and deliberately (Gordon, 1959; La Porta et al., 2000; Lintner, 1956). Dividend policy is expected to be influenced by the market structure. In less regulated markets, where firms face more information asymmetry for conveying their earnings quality to investors, they tend to depend more heavily on dividend payments as a signaling device. This study compares the dividend policies of firms in the United Kingdom (UK) by considering market differences and turbulences.

Examining two different markets, Alternative Investment Market (AIM) and highly regulated Main Market (MAIN), we utilize the difference in markets to understand whether firms in the less regulated market use dividend payments as a signaling tool. The AIM and MAIN markets in the UK provide a unique natural experiment to analyze how dividend policies differ across markets since AIM market possesses laxer regulation compared to the MAIN market (Acedo-Ramírez et al., 2019; Gerakos et al., 2013; Marshall et al., 2019; Tekin & Polat, 2020).

Besides, the global financial crisis, the Eurozone debt crisis also provides an opportunity to understand the role of market differences on dividends during recessions. Namely, we check whether the firms listed in MAIN decrease their dividend payments more than the firms in AIM during the recent recessions. Results indicate that MAIN firms in the strictly regulated market direct their internal funds to other sources during financial crises rather than worrying about a negative signal implied by a sharp decrease in dividend payments.

Our analysis shows that in general AIM firms use dividends as a signaling device for outside investors whereas MAIN firms use dividends as a disciplining device to limit managerial

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discretion. For the whole sample, AIM firms pay lower dividends compared to their MAIN counterparts. Regarding the effect of financial crises on the dividend policies, MAIN firms decrease their dividend payouts more than AIM firms. The reasons may be twofold. First, MAIN firms pay more dividends in general, so that they may have more room to decrease the payment level more during turbulence. Second, MAIN firms worry less about sending a negative signal to the investors. Thus, they decrease their dividend level easier than their AIM counterparts. AIM firms tend to increase their dividends more than MAIN firms after a financial turmoil, implying that AIM firms depend more strongly on the dividend payments as a signaling device. This is in line with the laxer market regulation in the AIM. Whereas the highly regulated MAIN market decreases firms' dependence on signaling needs. AIM firms with increased profitability, increase their dividends more to signal their future profitability to the investors. Following these results, one can claim that dividends are used as a signaling device by the AIM firms due to their operating in a less regulated market. Our analysis also sheds light on the effect of agency costs on dividend policy. By dividing our sample based on the level of the agency problem, we find that AIM firms that have notable agency problems, pay lower dividends compared to other AIM firms, in line with the outcome model (La Porta et al., 2000). We also conduct robustness checks. First, in order to address any endogeneity issue, we estimate our main model with system generalized method of moments (GMM). Our findings are qualitatively similar to the main findings. Second, by dividing the sample as MAIN and AIM firms, we compare the determinants of dividends and find that the significance and signs of coefficients are the same for MAIN and AIM except for sales growth. Third, low-levered firms, regardless of which market they are listed in, disgorge more cash than high-levered firms.

This study contributes to the literature in three ways. While the association between the global financial crisis and the firm-level differences has been analyzed for developing countries, this study is the first to examine this association for a developed country considering both the global financial crisis and Eurozone debt crisis. Next, the present research explores, for the first time, the impact of recent recessions on dividend policies across the AIM and MAIN. Last, this research further extends our understanding of the role of agency problems and market differences in dividend policy of UK firms, focusing on a developed market.

The rest of the study is organized as follows. Section 2 summarizes institutional and/or regulatory differences between MAIN and AIM. Section 3 reviews the literature and develops hypotheses. Section 4 briefly describes the sample and presents the empirical model. Section 5 discusses the empirical results. Finally, Section 6 concludes.

2. Market differences in the United Kingdom

London Stock Exchange has two different markets MAIN and AIM. AIM has less costly listing requirements (see Table 1) compared to MAIN, since the purpose of creating an alternative market, AIM, was to provide a special market for smaller and younger companies to raise capital, by offering them a substantial degree of flexibility (Farinha et al., 2018; Piotroski, 2013). Unlike MAIN, firms listed in AIM are not monitored by the UK's Financial Services Authority, but rather by nominated advisors (Piotroski, 2013). The goal of this monitoring choice is not to limit the oversight, but to shift it to the private sector (Gerakos et al., 2013). AIM also has laxer market information requirements on the firm's performance since firms are not required to keep a trading record, minimum public float or market capitalization (Espenlaub et al., 2012). Considering all the differences in regulatory and listing requirements of AIM, the firms listed in AIM face bigger information asymmetry (Gerakos et al., 2013; Tekin, 2020b, in press).

3. Literature review and hypotheses

Payout policy is an important tool for firms to disgorge cash. Grullon and Michaely (2002) investigate the reasons for the change in corporate payout policy. They show that repurchases are used as a substitute for dividends. Oded (2020) using the assumption that repurchases are flexible, but dividends are not, examines how firms choose between these two disbursement methods of free cash. The payout policy is determined by the trade-off between limiting the agency problem with committing to dividend payments and maintaining financial flexibility with open market stock repurchase programs. The main empirical prediction of his model is that mature firms tend to have high

Table 1
Market differences between MAIN and AIM.

	Main Market (MAIN)		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 recognized EU authority	–	Admission documents not pre-vetted by exchange or any listing authority
–	Admission takes several months	–	Admission is achieved within 2 weeks
–	Minimum market cap on entry (£700,000)	–	No minimum market cap
–	Sliding scale admission fees: min £6708 and max £388,173	–	Flat rate admission fee is min £7056 and max £79,601
–	No nominated advisor (NOMAD) required	–	NOMAD always required
–	Sliding scale annual fees: £4410 (<£50 m), £10,063 (<£50 m), £43,470 (>£500 m) market cap at issue	–	Flat rate annual fee is £5899 plus NOMAD fee

Notes: This table compares the differences of admission requirements and continuing obligations across the Main market (MAIN) and Alternative investment market (AIM) by Panel A and Panel B, respectively. Source: London Stock Exchange/Gerakos et al. (2013: 213).

payouts in the form of paying dividends, whereas growth firms are less likely to pay out cash, and if they do they prefer using repurchases rather than dividends in order not to commit themselves to future dividend payments. Fliers (2019) investigates the relationship between financial flexibility and dividend smoothing. He finds a nonlinear relation: The relation is positive for the firms with high levels of unused debt capacity, whereas it is negative for the firms with low levels of unused debt capacity. Ham et al. (2020) show that dividends convey information about future economic income. However, they claim that one should be cautious in interpreting their result to support traditional signaling models considering the timing of the information content.

Lintner (1956) provides evidence on dividend smoothing from six decades ago. There are also recent studies on dividend smoothing. Brav et al. (2005) claim that managers have such a strong incentive to smooth dividend payments that they even sometimes sacrifice positive NPV projects or seek external finance in order not to cut dividends. Using empirical evidence from the United Kingdom, Michaely and Roberts (2012) show that public firms smooth out dividends more than private firms. Their results imply that the scrutiny of capital markets has an important role in dividend smoothing. Leary and Michaely (2011) discuss that higher information asymmetry implies less smoothing. Namely, younger and smaller firms, the firms that pay low dividends and that have high earnings volatility all smooth less. Also, their results imply that firms facing agency conflicts smooth dividends the most. They also show that the least constrained and highest dividend-paying firms smooth dividends the most.

The signaling hypothesis posits that firms face information asymmetry about their earnings quality and prospects since outside investors do not have private information on a firm's true value. Thus, firms may use the dividend policy as a signaling tool to reduce the undervaluation problem. Lintner (1956) argues that managers do not tend to cut dividend payments worrying that reduced dividends may act as a negative signal to the market (Jensen et al., 2010). Thus, managers do not prefer to raise dividends in case of low permanent earnings. Otherwise, they must reduce dividend payments later, considering that high dividend payments are not sustainable with low earnings (Abreu & Gulamhussen, 2013). Signaling hypothesis implies that dividend payments are expected to be smooth since managers are concerned with volatile dividend payments. Therefore, how dividend policy changes over time is important in understanding the signaling hypothesis. This study focuses on crisis periods to understand whether firms in different markets in the UK behave differently regarding dividend payments.

The signaling hypothesis assumes that managers act on behalf of shareholders, implying that managers have incentives to signal the true value of the firm. However, there may be a conflict of interests between managers and shareholders (Jensen & Meckling, 1976). Agency theory focuses on the problems arising from the separation of ownership and control; and suggests that dividends can act as a tool to control managerial discretion by reducing the available funds for unprofitable investments. By paying out more dividends to shareholders, the managers are left with less free cash flow which directs them to look for funding from the capital markets. Considering the monitoring role of the capital markets, managers are ensured to serve the interest of shareholders (Easterbrook, 1984). Based on agency theory, firms with higher agency conflicts are expected to pay more dividends. Translating this argument into our data, we claim that if agency theory holds, then mature firms are expected to pay higher dividends compared to younger firms[1] (La Porta et al., 2000). Then, we conjecture that:

H1. AIM firms pay lower dividends than MAIN firms.

AIM market possesses laxer regulation compared to the MAIN market. Thus, AIM firms depend more on the signaling need through dividend payments compared to MAIN firms where the market regulation helps investors to invest in a more transparent institution. Investors feel more confident investing in a stricter regulated market which mitigates the agency problem at a significant level. Then, during a financial downturn,[2] AIM firms show further stronger incentives to signal their earnings quality and try not to cut dividends much during a financial crisis. This is due to the worry that a sharp decrease in dividends may act as a negative signal to the market. Then, we conjecture that:

H2. During a financial crisis, AIM firms drop dividends less than MAIN firms.

Two different incentives exist in the dividend payment policy for firms. Agency theory suggests that firms with more dispersed owners will pay more dividends to decrease the free cash flow in management hands. On the other hand, the signaling hypothesis suggests that firms facing more information asymmetry may use dividend payment as a signaling tool to attract investors. Considering that AIM firms, which are smaller and younger, have less dispersed ownership, they face fewer agency issues between the managers and shareholders. Thus, they have less need to use dividend payments as a disciplining device. However, AIM firms also face more information asymmetry (Farinha et al., 2018; Gerakos et al., 2013) since they have laxer regulation compared to their MAIN counterparts. In that sense, one expects that AIM firms

[1] Since admission requirements and continuing obligations are lighter in the AIM market, small and younger firms intend to be listed in AIM instead of the MAIN market (Acedo-Ramírez et al., 2019; Marshall et al., 2019; Tekin & Polat, 2020).

[2] Previous research investigates and shows a negative relationship between the global financial crisis and dividend policy (Abreu & Gulamhussen, 2013; Hauser 2013; Al-Malkawi et al., 2014; Attig et al., 2016; Bildik et al., 2015; Bliss et al., 2015; Floyd et al., 2015; Hilliard et al., 2018; Nguyen & Tran, 2016; Tran et al., 2017). Specifically, most of the literature focuses only on US firms (Abreu & Gulamhussen, 2013; Hauser 2013; Bliss et al., 2015; Floyd et al., 2015; Hilliard et al., 2018; Nguyen & Tran, 2016), others consider different countries, such as developing ones (Al-Malkawi et al., 2014; Nguyen & Tran, 2016). By pointing the firm-level differences out, Attig et al. (2016) points out that East Asian family firms decrease their dividend payouts more during the global financial crisis.

rely more heavily on signaling features of dividend payments. In order to examine which incentive dominates the other, we form our next hypothesis as follows:

H3a. AIM firms are positively (negatively) associated with an increase (decrease) in dividends.

If signaling incentive is dominant, one expects that AIM firms may increase dividends to signal their future profitability to the market. Thus, we conjecture that:

H3b. AIM firms with increased profitability are positively (negatively) associated with a dividend increase (decrease).

The substitute view agency theory suggests that dividend payments may disgorge future free cash flow for the managers and force them to seek funding in the capital markets, which acts as a monitoring device. Then it is expected that the firms facing higher agency problems pay more dividends (Attig et al., 2016; La Porta et al., 2000). On the other hand, if the outcome model explains the dividend behavior, then the firms facing higher agency problems pay fewer dividends. In our examination, because AIM firms are both usually smaller and are listed in a less regulated market, then AIM firms with significant agency problems may tend to pay fewer dividends compared to other AIM firms as supported by the outcome model of La Porta et al. (2000). Thus, we check whether the outcome model is valid in explaining dividend behavior of AIM firms.

H4. AIM firms with notable agency problems pay lower dividends than other AIM firms.

4. Data and research design

4.1. The sample

We draw our sample of 12,170 firm-year observations representing 1247 sample firms from the MAIN (602) and AIM (645) using Worldscope in DataStream International for the period 2002–2017. We construct our sample as follows. First, we keep non-financial firms by eliminating financial and utility firms (Tekin, 2020a). Next, we drop the firms with missing observations for each variable in empirical models. Last, we winsorize all continuous variables at 1% and 99% to overcome the outlier effect in our sample (Tekin & Polat, 2020). We present the descriptive statistics and correlation matrix in Table A1.

4.2. The model

Since the dividend policy may vary depending on the nature of firms, which are dividend payers or nonpayers, we use two types of dividend measures: Tobit (censored[3] and continuous) and Logit (binary) to test our hypotheses. First, we use dividends/assets for the Tobit model (Byrne & O'Connor, 2017; Coldbeck & Ozkan, 2018). Then, we employ dividends increase and dividends decrease as binary choices using the Logit model (Byrne & O'Connor, 2017; Jiraporn & Lee, 2017).

Regarding main explanatory variables, first, following Gerakos et al. (2013), we proxy for market control employing AIM, a dummy variable equal to 1 for the firms listed in AIM, otherwise 0, as follows:

$$\begin{aligned}\text{Tobit (DIV)}_{ij,t} = {} & \alpha + \beta_1 \text{AIM}_j + \beta_2 \text{SALES\_GR}_{i,t} \\ & + \beta_3 \text{SIZE}_{i,t-1} + \beta_4 \text{PROF}_{i,t-1} + \beta_5 \text{LEV}_{i,t-1} \\ & + \beta_6 \text{CASH}_{i,t-1} + \sum \text{INDUSTRY} \\ & + \sum \text{YEAR} + v_{ij} + \varepsilon_{ij,t}\end{aligned} \tag{1}$$

where $\text{DIV}_{ij,t}$ is cash dividends paid to total assets for firm i and market j at time t, AIM_i is AIM dummy, five control explanatory variables are $\text{SALES\_GR}_{i,t}$ is the change in sales growth, $\text{SIZE}_{i,t-1}$ is lagged firm size, $\text{PROF}_{i,t-1}$ is lagged profitability, $\text{LEV}_{i,t-1}$ is lagged leverage, $\text{CASH}_{i,t-1}$ is lagged cash holdings, v_{ij} controls unobservable factors which affect the dividend ratio and $\varepsilon_{ij,t}$ is the error term.

Second, we interact AIM with CRISES, a dummy variable equal to 1 for the years of recent financial crises 2007–2012, namely the Global Financial Crisis 2007–2009 (GFC) and Eurozone Debt Crisis 2010–2012 (EDC), otherwise 0, as follows:

$$\begin{aligned}\text{Tobit(DIV)}_{ij,t} = {} & \alpha + \beta_1 \text{AIM}_j + \beta_2 \text{AIM}_j \text{xCRISES}_t \\ & + \beta_3 \text{SALES\_GR}_{i,t} + \beta_4 \text{SIZE}_{i,t-1} \\ & + \beta_5 \text{PROF}_{i,t-1} + \beta_6 \text{LEV}_{i,t-1} + \beta_7 \text{CASH}_{i,t-1} \\ & + \sum \text{INDUSTRY} + \sum \text{YEAR} + v_{ij} + \varepsilon_{ij,t}\end{aligned} \tag{2a}$$

where, AIM_i x CRISES_t is the interaction of AIM dummy and CRISES dummy.

We also interact AIM with (i) GFC, a dummy variable equal to 1 for the years 2007–2009, otherwise 0, and (ii) EDC, a dummy variable equal to 1 for the years 2010–2012, otherwise 0 as follows:

$$\begin{aligned}\text{Tobit (DIV)}_{ij,t} = {} & \alpha + \beta_1 \text{AIM}_j + \beta_2 \text{AIM}_j \text{xGFC}_t \\ & + \beta_2 \text{AIM}_j \text{xEDC}_t + \beta_3 \text{SALES\_GR}_{i,t} \\ & + \beta_4 \text{SIZE}_{i,t-1} + \beta_5 \text{PROF}_{i,t-1} + \beta_6 \text{LEV}_{i,t-1} \\ & + \beta_7 \text{CASH}_{i,t-1} + \sum \text{INDUSTRY} \\ & + \sum \text{YEAR} + v_{ij} + \varepsilon_{ij,t}\end{aligned} \tag{2b}$$

where, AIM_i x GFC_t and AIM_i x EDC_t are the interaction of AIM dummy with GFC and EDC dummy, respectively.

Third, we investigate the role of the change in dividends by testing Equation (1) and employing Logit models for DIV_INC and DIV_DEC as follows:

[3] Regressions on dividends distribute as: (i) discrete ($y_i = 0$ if $y_i^* \leq 0$) or (ii) continuous ($yi = yi^*$ if $yi^* > 0$), where y_i^* is the original dependent variable and y_i is the transformed dependent variable.

$$\text{Logit (DIV\_INC)}_{ij,t} = \alpha + \beta_1 \text{AIM}_j + \beta_2 \text{SALES\_GR}_{i,t} + \beta_3 \text{SIZE}_{i,t-1} + \beta_4 \text{PROF}_{i,t-1} + \beta_5 \text{LEV}_{i,t-1} + \beta_6 \text{CASH}_{i,t-1} + \sum \text{INDUSTRY} + \sum \text{YEAR} + v_{ij} + \varepsilon_{ij,t} \quad (3a)$$

$$\text{Logit(DIV\_DEC)}_{ij,t} = \alpha + \beta_1 \text{AIM}_j + \beta_2 \text{SALES\_GR}_{i,t} + \beta_3 \text{SIZE}_{i,t-1} + \beta_4 \text{PROF}_{i,t-1} + \beta_5 \text{LEV}_{i,t-1} + \beta_6 \text{CASH}_{i,t-1} + \sum \text{INDUSTRY} + \sum \text{YEAR} + v_{ij} + \varepsilon_{ij,t} \quad (3b)$$

Fourth, we interact AIM with ΔPROF, the change in PROF from year t-1 to year t, to test the role of increased profitability on the change in dividends of AIM firms, as follows:

$$\text{Logit(DIV\_INC)}_{ij,t} = \alpha + \beta_1 \text{AIM}_j + \beta_2 \text{AIM}_j \text{x} \Delta\text{PROF} + \beta_3 \text{SALES\_GR}_{i,t} + \beta_4 \text{SIZE}_{i,t-1} + \beta_5 \text{PROF}_{i,t-1} + \beta_6 \text{LEV}_{i,t-1} + \beta_7 \text{CASH}_{i,t-1} + \sum \text{INDUSTRY} + \sum \text{YEAR} + v_{ij} + \varepsilon_{ij,t} \quad (4a)$$

$$\text{Logit(DIV\_DEC)}_{ij,t} = \alpha + \beta_1 \text{AIM}_j + \beta_2 \text{AIM}_j \text{x} \Delta\text{PROF} + \beta_3 \text{SALES\_GR}_{i,t} + \beta_4 \text{SIZE}_{i,t-1} + \beta_5 \text{PROF}_{i,t-1} + \beta_6 \text{LEV}_{i,t-1} + \beta_7 \text{CASH}_{i,t-1} + \sum \text{INDUSTRY} + \sum \text{YEAR} + v_{ij} + \varepsilon_{ij,t} \quad (4b)$$

where $\text{DIV\_INC}_{ij,t}$ ($\text{DIV\_DEC}_{ij,t}$) is the increase (decrease) in cash dividends paid for firm i in market j from time t-1 to time t and AIM_j x ΔPROF is the interaction of AIM dummy and the difference in profitability.

Last, we split our sample according to the level of agency costs and investment opportunities. We measure agency costs as (i) selling, general and administrative expenses to sales and (ii) residual from a regression of cash flow on AIM, and investment opportunities as the industry median of market-to-book ratio (Q).

Then, we divide our sample by low agency-high industry Q, high agency-low industry Q depending on whether the values are above-median (high) or below-median (low) year by year (Attig et al., 2016; Chen et al., 2011; Fatemi & Bildik, 2012; Lins et al., 2013) and analyze Equation (1).

Regarding the control explanatory variables, we use five firm-level factors in our regressions. Following Fama and French (2001), we proxy investment opportunities with sales growth, firm size with the logarithm of total assets and profitability with earnings before interest, tax, depreciation, and amortization. Besides that, we add leverage (Andres & Hofbaur, 2017) and cash holdings (Tran et al., 2017). Also, we control both industry- and year-fixed effects using a set of industry- and year-dummies. We present variable definitions in Table 2.

Since our data is a panel, which includes both time-series and cross-sections, we can use Pooled Ordinary Least Squares (OLS), Fixed Effects (FE) or Random Effects (RE) Tobit (Logit) model. While Pooled OLS may overcome biases associated with OLS regressions, FE or RE adjusts standard errors by clustering at the firm level. Our main explanatory variable (AIM) is time-invariant; that is why we use RE[4] instead of FE. Also, we follow recent research (Athari et al., 2016) and compare the Pooled Tobit (Logit) and RE Tobit (Logit) to choose the proper model.[5]

5. Empirical results

5.1. The role of market differences and financial crises on dividends and its determinants

We compare differences in the mean of dividends (Fig. 1) and its firm-level determinants across the AIM and MAIN in Ta2ble 3. AIM firms show similar behavior to smaller and financially constrained firms; so that they pay lower dividends than MAIN firms. Specifically, AIM firms have lower profitability and debt, but higher growth and cash holdings compared to their MAIN counterparts, due to additional financial restrictions they face.

We examine the role of market differences using AIM dummy and firm-level controls on dividends in Table 4. As in line with univariate tests, AIM firms pay lower dividends than MAIN firms (the coefficient of AIM is −0.001 at 1%), so we do not reject H1. Our result confirms previous research. For example, Attig et al. (2016) find that family firms that are financially constrained pay lower dividends than nonfamily firms in East Asia.

Firm-level variables also significantly affect dividends. In line with theoretical predictions, firms with higher growth opportunities (Attig et al., 2016), smaller size and lower profitability (Berzins et al., 2017) pay lower dividends. Contrary to theoretical predictions, firms with lower leverage (Athari et al., 2016) and higher cash (Attig et al., 2016) pay higher dividends.

Our sample period 2002–2017 includes two recent financial crises, namely the Global Financial Crisis, 2007–2009, and Eurozone Debt Crisis, 2010–2012. Consequently, we interact CRISES dummy with AIM dummy to understand the role of recent.

Financial crises and market differences on dividends in Table 4. While the coefficient of AIM is negative and significant by 0.007 at 1%, the coefficient of interaction between AIM and CRISES is positive and significant by 0.003 at 5%.

[4] We formulate the RE Tobit (RE Logit) model as follows: $y_{ij,t} = x_{ij,t} \beta + v_{ij} + \varepsilon_{ij,t}$, where $y_{ij,t}$ is the dividend ratio of firm i and market j at year t, β is the coefficient vector and $x_{ij,t}$ is a vector of the firm- and market-characteristics, v_{ij} is controlling the RE for unobservable factors and $\varepsilon_{ij,t}$ is the error term.

[5] The likelihood ratio (LR) of rho ($\rho = H0 = 0$) is the formal test to compare the Pooled and RE Tobit (Logit).

Table 2
Variable definitions.

Variables	Definitions	Calculation by items
Dependent		
DIV	Cash dividends paid/Total assets	WC04551/WC02999
DIV_INC	The dummy variable is one if the paid dividends in year *t* is larger than in year *t-1*, otherwise zero	Author calculation
DIV_DEC	The dummy variable is one if the paid dividends in year *t* is smaller than in year *t-1*, otherwise zero	Author calculation
Explanatory		
AIM	Dummy variable is one for the listed firms in AIM, otherwise zero	Author calculation
CRISES	Dummy variable is one for the years of 2007−2012, otherwise zero	Author calculation
GFC	Dummy variable is one for the years of 2007−2009, otherwise zero	Author calculation
EDC	Dummy variable is one for the years of 2010−2012, otherwise zero	Author calculation
Industry Q	The industry median Q in year t. Q = [Total assets − Book value of equity + Market value of equity]/Total assets	Author calculation [WC02999 − WC03501 + WC08001]/WC02999
SG&A/S	Selling, general and administrative expenses/Total Sales	WC01101/WC01001
R_CFLOW	Residual from a regression of cash flow on AIM. Cash flow = [Pre-tax income + Depreciation − Cash and short-term investments]/Total assets	Author calculation [WC01401 + WC01151 − WC02001]/WC02999
High SG&A/S & Low Q	Dummy variable is one for the firms which their selling, general and administrative expenses divided by sales is above median and their industry Q is below median.	Author calculation
Low SG&A/S & High Q	Dummy variable is one for the firms which their selling, general and administrative expenses divided by sales is below median and their industry Q is above median.	Author calculation
High R_CFLOW & Low Q	Dummy variable is one for the firms which their residual cash flow is above median and their industry Q is below median.	Author calculation
Low R_CFLOW & High Q	Dummy variable is one for the firms which their residual cash flow is below median and their industry Q is above median.	Author calculation
SALES_GR	[Total Sales in *t* − Total Sales in *t-1*]/Total Sales in *t-1*	[WC01001 − L.WC01001]/L.WC01001
L.SIZE	The log of total assets year by year	L.[Ln [WC02999]]
L.PROF	Earnings before interest, tax, depreciation, and amortization (EBITDA)/Total assets	L.[WC18198/WC02999]
ΔPROF	The change in PROF from year *t-1* to year *t*	Author calculation
L.LEV	Total debt/Total assets	L.[WC03255/WC02999]
L.CASH	Cash and short-term investments/Total assets	L.[WC02001/WC02999]

In other words, AIM firms decrease their dividends lower than MAIN firms during the financial crises, which does not reject H2. Specifically, since MAIN firms are larger and pay higher dividends and are less worried about sending a negative signal, it is expected that they decrease dividends easier than AIM firms during a turbulence.

5.2. The role of change in AIM firms' profitability on dividend changes

In Table 5, we examine the role of market differences on dividend changes in columns 1−2 and the role of change in the profitability of AIM firms on dividend changes in columns 3−4

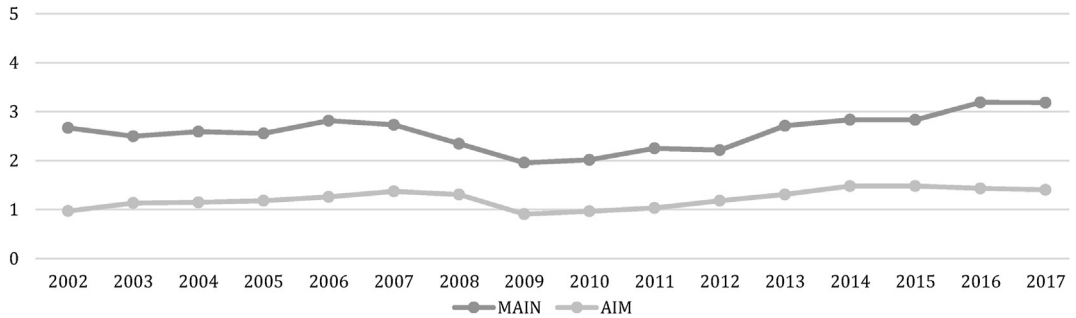

Fig. 1. The trend of dividends between MAIN and AIM.

Table 3
Univariate tests.

	AIM	MAIN	MAIN vs. AIM	Difference
	(1)	(2)	(3) = (2)−(1)	*t*-test
DIV	0.013	0.026	0.013	[21.82][a]
SGR	0.107	0.087	−0.020	[-3.78][a]
L.SIZE	10.138	12.619	2.481	[65.16][a]
L.PROF	−0.020	0.093	0.113	[30.12][a]
L.LEV	0.141	0.202	0.061	[18.96][a]
L.CASH	0.207	0.146	−0.061	[-17.76][a]

Notes: This table reports the mean of dividend and its determinants across AIM and MAIN in column 1 and column 2, respectively. In column 3, we report the mean differences between AIM and MAIN by presenting t-tests in brackets and their significance level. All variables are described in Table 2.
[a] Implies statistical significance at 1%. Source: Worldscope.

employing Logit models. First, we document that AIM firms are positively (negatively) associated with an increase (decrease) in dividends, implying that AIM firms are more (less) likely to increase (decrease) dividends. Thus, we summarize that the signaling hypothesis works for AIM firms, which prove H3a.

Next, we use interactions between AIM and the change in profitability (ΔPROF). We find that AIM firms with increased profitability are more likely to increase dividends. However, there is no significant association between AIM x ΔPROF and decreasing dividends. Consequently, since the increased profitability gives the flexibility of free cash flow, AIM firms with increased profitability may increase their dividend payments to the investors using dividends as the signaling device. So, we do not reject H3b.

Table 4
The role of market differences and financial crises on dividends.

Variables	Dependent variable: DIV		
	(1)	(2)	(3)
AIM x CRISES		0.002**	
		(0.001)	
AIM x GFC			0.003***
			(0.001)
AIM x EDC			0.002
			(0.001)
AIM	−0.006***	−0.007***	−0.007***
	(0.002)	(0.002)	(0.002)
SALES_GR	−0.005***	−0.005***	−0.005***
	(0.001)	(0.001)	(0.001)
L.SIZE	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)
L.PROF	0.024***	0.024***	0.024***
	(0.002)	(0.002)	(0.002)
L.LEV	−0.014***	−0.014***	−0.014***
	(0.002)	(0.002)	(0.002)
L.CASH	0.015***	0.015***	0.015***
	(0.002)	(0.002)	(0.002)
Rho	0.466	0.466	0.466
LR test	4347***	4349***	4349***
Year FE	✓	✓	✓
Industry FE	✓	✓	✓
# of firms	1247	1247	1247
# of N	12,170	12,170	12,170

Notes: This table presents the role of market differences and financial crisis on dividends using Tobit model. Dividends are cash dividends paid to total assets. All variables are defined in Table 2. *** and ** imply significance at 1% and 5%, respectively.

5.3. The role of agency costs on dividends of AIM firms

We further investigate the role of agency costs and investment opportunities on dividends of AIM firms in Table 6. We split our sample as (i) low-agency costs & high-industry Q and (ii) high-agency costs & low-industry Q (Attig et al., 2016; Chen et al., 2011; Lins et al., 2013). For robustness, we calculate agency costs by two methods: selling, general and administration expenses to sales (SG&A/S) and residual cash flow (R_CFLOW) (Chen et al., 2011). Interestingly, we find that AIM has a significantly negative impact on dividends when the agency costs are high as presented in columns 2 and 4. This finding confirms H4. To conclude, our subsample analyses via the agency explanation prove the negative association between AIM and dividends, prompting a negative aspect of the AIM market regarding agency costs.

5.4. Robustness checks

We conduct robustness checks to make sure our results do not suffer from an econometric issue. First, we retest Hypothesis 1 by employing the system generalized method of moments (GMM). Our findings are qualitatively similar to the main findings as seen in Panel A of Table A2. Therefore, our results do not suffer from the endogeneity issue.

As a second robustness check, we divided the sample by MAIN and AIM, then we compare determinants of dividends in Panel B of Table A2. We show that the significance and coefficient signs of determinants are the same for MAIN and AIM other than sales growth. Only, the negative impact of

Table 5
The role of change in AIM firms' profitability on dividend changes.

Variables	DIV_INC	DIV_DEC	DIV_INC	DIV_DEC
	(1)	(2)	(3)	(4)
AIM x ΔPROF			2.192***	0.111
			(0.326)	(0.274)
AIM	0.190**	−0.182**	0.280***	−0.180**
	(0.095)	(0.077)	(0.095)	(0.078)
SALES_GR	−0.417***	0.289***	−0.556**	−0.280*
	(0.105)	(0.101)	(0.108)	(0.103)
L.SIZE	0.413***	0.156**	0.413***	0.155**
	(0.024)	(0.018)	(0.024)	(0.018)
L.PROF	4.733***	2.118***	5.255***	2.201***
	(0.234)	(0.193)	(0.249)	(0.203)
L.LEV	−1.271***	−0.867***	−1.351***	−0.901***
	(0.210)	(0.187)	(0.210)	(0.188)
L.CASH	−0.205	−1.441***	0.154	−1.472***
	(0.214)	(0.201)	(0.217)	(0.203)
Rho	0.230	0.127	0.222	0.124
LR test	518***	200***	491***	193***
Year FE	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓
# of firms	1252	1252	1248	1248
# of N	12,675	12,675	12,560	12,560

Notes: This table presents the role of change in profitability on dividend changes of AIM firms using Logit model. DIV_INC is the increase in dividends from time t-1 to t. DIV_DEC is the decrease in dividends from time t-1 to t. All variables are defined in Table 2. ***, ** and * imply significance at 1%, 5% and 10%, respectively.

Table 6
The role of agency costs on dividends of AIM firms.

Split by	Dependent variable: DIV			
	Selling, general & administration expenses/sales		Residual cash flow	
Agency costs → *Industry Q* → Variables	*Low & High* (1)	*High & Low* (2)	*Low & High* (3)	*High & Low* (4)
AIM	−0.004	−0.010***	−0.003	−0.005**
	(0.003)	(0.003)	(0.003)	(0.002)
SALES_GR	−0.001	−0.004**	−0.008***	−0.003**
	(0.003)	(0.002)	(0.003)	(0.001)
L.SIZE	0.002**	0.002***	0.003***	0.001**
	(0.001)	(0.001)	(0.001)	(0.000)
L.PROF	0.054***	0.022***	0.138***	0.020***
	(0.005)	(0.003)	(0.010)	(0.003)
L.LEV	−0.009*	−0.013***	−0.018***	−0.008**
	(0.005)	(0.004)	(0.005)	(0.003)
L.CASH	0.031***	0.019***	0.023**	0.021***
	(0.006)	(0.004)	(0.012)	(0.003)
Rho	0.630	0.490	0.473	0.447
LR test	523***	871***	398***	607***
Year FE	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓
# of firms	396	456	503	720
# of N	1625	2193	2137	3213

Notes: This table presents the role of agency costs and investment opportunities on dividends using Tobit model. Dividends are cash dividends paid to total assets. All variables are defined in Table 2. ***, ** and * imply statistical significance at 1%, 5% and 10%, respectively.

sales growth for AIM firms is less significant. Besides, we check whether the effect of.

AIM firms' profitability on dividend changes is the same across p25, p50 and p75. Our findings, as shown in Table A3, indicate that the marginal effects are the same.

Firms with lower sales growth and leverage pay higher dividends. Also, larger firms and those with higher profitability and cash holdings disgorge more cash. However, this picture changes when we interact the firm-specific variables with AIM and CRISES (Table A4). During crises, contrary to main analyses, the firms with higher sales growth and cash balances increase their dividend payments. Also, firms with lower cash and larger firms disgorge more cash during a crisis. By interacting firm-specific variables with AIM, we show that the results are just the opposite of the main analyses. Notably, AIM firms with higher sales growth and leverage, lower profitable and cash pay higher dividends. In sum, firm-specific determinants of dividends differ with arising turbulence and institutional settings.

Regarding the impact of leverage on dividends, MAIN firms pay higher dividends than AIM firms, as shown in Table 3. Coefficients of leverage for MAIN and AIM firms are negative and significant (at 1%) by 0.021 and 0.008, respectively (Table A2). Specifically, low-levered firms, regardless of which market they are listed in, disgorge more cash than high-levered firms in the UK as presented in Figure A1 which is in line with Table 3.

To establish the difference in preference for signaling between AIM and MAIN firms, we estimate the effects of dividend increases (decreases) on the firm's stock price interacted with AIM and lagged changes in profits in Table A5. The dividend-increasing AIM firms have higher stock prices that confirm our findings related to our hypotheses. Consistent with the signaling theory, the stock market reacts positively to dividend increases for AIM firms. Besides, the dividend-decreasing AIM firms seem not to be punished by the stock market, since they do not experience a decrease in their stock price. However, more profitable dividend-decreasing AIM firms experience an increase in their stock prices. This may imply profitable AIM firms signal their earnings quality through another signaling device rather than dividends.

6. Conclusion

We examine the effect of market differences, recent financial crises, and agency problems on dividend payouts of 1247 UK firms between 2001 and 2017. Using Tobit models, we find that AIM firms pay lower dividends than MAIN firms. However, the picture changes during the financial crises; AIM firms decrease dividends lower than MAIN firms. Besides, AIM firms are positively (negatively) related to increases (decreases) in dividends. Moreover, AIM firms with increased profitability are more likely to increase dividends. These results imply that AIM firms use dividends as a signaling device. By dividing our sample based on the level of the agency problem, we show that AIM firms that face higher agency problems pay lower dividends compared to other AIM firms, supporting the outcome model of agency cost.

This research confirms previous findings and contributes additional evidence that the dividend policy changes across different markets and the level of agency cost. The role of market differences on dividends varies during the financial crises. Also, firms with increased profitability change their dividend payout in a different way when they are listed in different markets. Overall, the signaling hypothesis seems to explain AIM firms' dividend payout policy better. Therefore, investors should consider market differences and financial crises. Also, firms should strategically choose which market to be listed in.

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Appendices.

Table A1
Descriptive statistics and correlation matrix

Panel A. Descriptive statistics

Variables	Mean	SD	Min	P25	P50	P75	Max
DIV	0.019	0.035	0.000	0.000	0.007	0.026	0.472
AIM	0.481	0.500	0.000	0.000	0.000	1.000	1.000
SGR	0.095	0.297	−0.999	−0.033	0.069	0.227	0.983
L.SIZE	11.432	2.462	5.472	9.662	11.257	13.057	19.968
L.PROF	0.040	0.216	−0.922	−0.003	0.092	0.157	0.858
L.LEV	0.173	0.182	0.000	0.007	0.128	0.272	0.906
L.CASH	0.175	0.194	0.000	0.043	0.104	0.236	0.998

Panel B. Correlation Matrix

Variables	DIV	AIM	SGR	L.SIZE	L.PROF	L.LEV	VIF
AIM	−0.192***						1.38
SGR	−0.054***	0.031***					1.01
L.SIZE	0.222***	−0.516***	−0.059***				1.65
L.PROF	0.388***	−0.266***	0.004***	0.419***			1.28
L.LEV	−0.060***	−0.171***	−0.040***	0.242***	0.021***		1.19
L.CASH	−0.017***	0.157***	0.068***	−0.318***	−0.271***	−0.338***	1.26

Notes: Table A1 reports the descriptive statistics and correlation matrix. Since the maximum VIF is 1.65 that is smaller than 10 (Freund et al., 2006), our explanatory variables do not suffer from multicollinearity. Source: Worldscope.

Table A2
Robustness checks:1

Dependent variable: DIV

Estimator	Panel A. IV approach	Panel B. Comparison of determinants across MAIN and AIM	
	GMM	TOBIT	TOBIT
	(1) ENTIRE	(2) MAIN	(3) AIM
AIM	−0.016***		
	(0.005)		
SALES_GR	−0.003***	−0.009***	−0.002**
	(0.001)	(0.001)	(0.001)
L.SIZE	0.002**	0.001***	0.002***
	(0.001)	(0.000)	(0.000)
L.PROF	0.010***	0.037***	0.016***
	(0.002)	(0.003)	(0.002)
L.LEV	−0.008***	−0.021***	−0.008***
	(0.003)	(0.003)	(0.002)
L.CASH	0.005	0.022***	0.011***
	(0.003)	(0.003)	(0.002)
Rho		0.465	0.461
LR test		2293***	1747***
AR (2)	[0.120]		
Hansen	[0.000]		
Year FE	✓	✓	✓
Industry FE	✓	✓	✓
# of firms	1247	602	645
# of N	12,170	6375	5795

Notes: This table presents the role of market differences and financial crisis on dividends using Tobit model. Dividends are cash dividends paid to total assets. All variables are defined in Table 2. *** and ** imply significance at 1% and 5%, respectively.

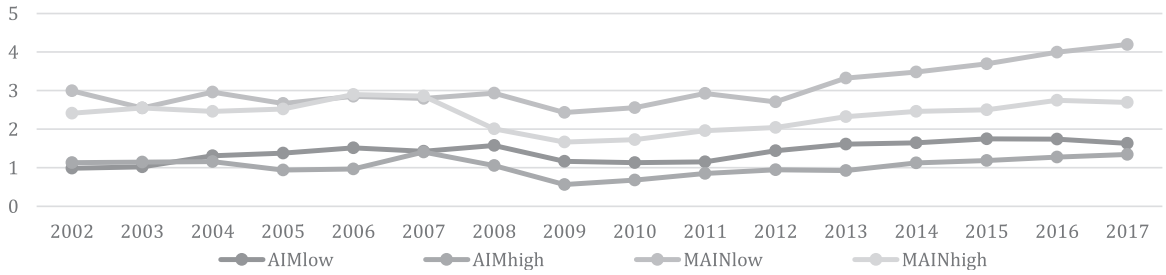

Fig. A1. The trend of dividends between high-levered and low-levered MAIN and AIM firms

Table A3
Robustness checks:2

	Dependent variable: DIV_INC				Dependent variable: DIV_DEC			
	(1)	P25	P50	P75	(2)	P25	P50	P75
	Coefficient Estimates	Marginal Effects	Marginal Effects	Marginal Effects	Coefficient Estimates	Marginal Effects	Marginal Effects	Marginal Effects
AIM x ΔPROF	2.192***	2.392***	2.392***	2.392***	0.111	0.331	0.331	0.331
	(0.326)	(0.326)	(0.326)	(0.326)	(0.274)	(0.280)	(0.280)	(0.280)
AIM	0.280***	0.112	0.112	0.112	−0.180**	−0.262***	−0.262***	−0.262***
	(0.095)	(0.096)	(0.096)	(0.096)	(0.078)	(0.080)	(0.080)	(0.080)
SALES_GR	−0.556**	−0.558***	−0.558***	−0.558***	−0.280*	0.239**	0.239**	0.239**
	(0.108)	(0.106)	(0.106)	(0.106)	(0.103)	(0.102)	(0.102)	(0.102)
L.SIZE	0.413***	0.356***	0.356***	0.356***	0.155**	0.120***	0.120***	0.120***
	(0.024)	(0.023)	(0.023)	(0.023)	(0.018)	(0.017)	(0.017)	(0.017)
L.PROF	5.255***	5.532***	5.532***	5.532***	2.201***	2.555***	2.555***	2.555***
	(0.249)	(0.253)	(0.253)	(0.253)	(0.203)	(0.207)	(0.207)	(0.207)
L.LEV	−1.351***	−1.416***	−1.416***	−1.416***	−0.901***	−0.593***	−0.593***	−0.593***
	(0.210)	(0.211)	(0.211)	(0.211)	(0.188)	(0.187)	(0.187)	(0.187)
L.CASH	0.154	−0.468**	−0.468**	−0.468**	−1.472***	−1.659***	−1.659***	−1.659***
	(0.217)	(0.219)	(0.219)	(0.219)	(0.203)	(0.207)	(0.207)	(0.207)
Rho	0.222				0.124			
LR test	491***				193***			
Year FE	✓				✓			
Industry FE	✓				✓			
# of firms	1247				1248			
# of N	12,100				12,100			

Notes: This table represents the role of change in profitability on dividend changes of AIM firms and its marginal effects at distribution using Logit model. DIV_INC is the increase in dividends from time t-1 to t. DIV_DEC is the decrease in dividends from time t-1 to t. All variables are defined in Table 2. ***, ** and * imply significance at 1%, 5% and 10%, respectively.

Table A4
Robustness checks:3

Variables	Dependent variable: DIV
	(1)
AIM	−0.010
	(0.007)
CRISES	−0.007*
	(0.004)
AIM x SALES_GR	0.009***
	(0.002)
AIM x L.SIZE	0.000
	(0.001)
AIM x L.PROF	−0.024***
	(0.004)
AIM x L.LEV	0.009**
	(0.004)
AIM x L.CASH	−0.013***
	(0.004)
CRISES x SALES_GR	0.006**
	(0.003)
CRISES x L.SIZE	0.001*
	(0.000)
CRISES x L.PROF	−0.024***
	(0.004)
CRISES x L.LEV	−0.002
	(0.004)
CRISES x L.CASH	−0.008*
	(0.004)
SALES_GR	−0.010***
	(0.002)
L.SIZE	0.001***
	(0.000)
L.PROF	0.046***
	(0.003)
L.LEV	−0.018***
	(0.003)
L.CASH	0.026***
	(0.003)
Rho	0.463
LR test	4207***
Year FE	✓
Industry FE	✓
# of firms	1247
# of N	12,170

Notes: This table presents the role of market differences and financial crisis on dividends using Tobit model. Dividends are cash dividends paid to total assets. All variables are defined in Table 2. *** and ** imply significance at 1% and 5%, respectively.

Table A5
Robustness checks:4

Variables	Dependent variable: Price	
	(1) DIV_INC	(2) DIV_DEC
DIV_INC x AIM x L.ΔPROF	0.255	
	(0.235)	
DIV_INC x AIM	0.120***	
	(0.038)	
DIV_INC	0.082***	
	(0.021)	
DIV_DEC x AIM x L.ΔPROF		0.725***
		(0.239)
DIV_DEC x AIM		0.061
		(0.044)
DIV_DEC		0.046**
		(0.022)
AIM x ΔPROF	0.444***	0.482***
	(0.103)	(0.103)
AIM	0.231*	0.273**
	(0.127)	(0.126)
SALES_GR	0.612***	0.600***
	(0.048)	(0.047)
L.SIZE	0.442***	0.454***
	(0.033)	(0.033)
L.PROF	0.814***	0.848***
	(0.164)	(0.165)
L.LEV	−0.687***	−0.700***
	(0.191)	(0.193)
L.CASH	0.403**	0.434**
	(0.185)	(0.185)
Constant	−1.573***	−1.730***
	(0.443)	(0.442)
Rho	0.815	0.814
Year FE	✓	✓
Industry FE	✓	✓
# of firms	1117	1208
# of N	10,667	11,623

Notes: This table presents the role of change in profitability and dividends of AIM firms on stock price using Random effect panel model. Dependent variable is stock price (P) that is retrieved from Datastream by employing its logged version. DIV_INC is the increase in dividends from time t-1 to t. DIV_DEC is the decrease in dividends from time t-1 to t. All variables are defined in Table 2. ***, ** and * imply significance at 1%, 5% and 10%, respectively.

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