ANNALS OF ECONOMICS AND FINANCE **22-2**, 421–449 (2021)

Earnings, Working Capital and Dividend Payout: Evidence from the London Stock Exchange

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This paper examines the impacts of the earnings and working capital on the dividend payout, using firms listed on the London Stock Exchange from 1991 to 2015. The results reveal that unadjusted earnings have a positive and significant impact on firms' dividend payout, whereas the dividend-adjusted earnings are insignificant in explaining firms' dividend payout. Moreover, we find that there exists an "inverse U-shape" relationship between the working capital and dividend payout. Our findings provide more coherent evidence between the earnings and dividend payout and highlight the importance of considering working capital as a determinant in designing corporate dividend payout policy.

Key Words: Dividend Payout; Earnings; Working Capital; "Inverse U-shape" Relationship.

JEL Classification Numbers: G30, G35, M41.

1. INTRODUCTION

Pioneered by Lintner (1956) who investigates the relationship between earnings and dividend payout, the issue of dividend payout has received considerable attention in the theoretical and empirical literature (Sawicki 2009; Aggarwal and Kyaw, 2010; Lee, 2010; De Cesari and Huang-Meier, 2015). Throughout corporate finance literature, the hypothesis that earnings have an important impact on dividend payout has been extensively examined and has granted a large amount of evidence that is strongly supportive of that view (DeAngelo et al., 2006). Some studies argue that the earnings affect the dividend payout positively (Lintner, 1956; Skinner,

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1529-7373/2021

2008; Von Eije and Megginson, 2008). For example, Fama and French (2001) show that the earnings have a positive and significant effect on the dividend payout for the U.S. firms. A cross-country study by Fatemi and Bildik (2012) also finds that firms with higher earnings are more likely to issue greater dividend payout. On the other hand, others find dividend payout is negatively determined by the earnings (Fukuda, 2000; Ferris et al., 2006; Fairchild et al., 2014). For example, Pettit (1976) finds that earnings affect the dividend payout negatively in the U.S. stock market. Similarly, Ferris et al. (2006), who analyse the stock markets in the U.K. and Japan, reveal a negative relationship between earnings and dividend payout. In contrast, based on the Standard & Poor's (S&P) 500 index quarterly data over the period 1988-2002, Farsio et al. (2004) find that in the long-run, earnings have no statistically significant effect on the dividend payout.

In spite of the adequate literature, the current earnings have been usually measured inappropriately. Since a firm's payout policy is declared after recognising earnings for distribution, the earnings variable partially contains the information of dividend payout. The coefficient of earnings tends to be either overestimated or underestimated, which may result in misleading policy implications (see a thorough discussion in Section 2.1). Thus, it is important to measure the earnings properly and obtain more reliable results in understanding the relationship between the earnings and dividend payout.

In addition to the significant influence of earnings on corporate dividend payout, the importance of working capital in determining corporate financial decisions has also been documented. It is reported that the ratios of the U.S. firms' total investment in working capital (i.e., inventories plus receivables) to their total sales and the book value of their assets are 24% and 18% at the end of 2011, respectively (Aktas et al., 2015). Similar findings are also reported for the U.K. firms. Wilson (2014) pointed out that the ratio of trade receivables to the total assets of smaller firms is around 30% to 35%, that of medium firms is around 20-24%, and that of larger firms is 15% over the time period 2000 to 2012 in the U.K..

A number of studies have found that working capital has a significant impact on firms' performance (see Deloof, 2003; Enqvist et al., 2014; Aktas et al., 2015). Using 2,000 Belgian firms for the period 1991 to 1996, Deloof (2003) finds that the working capital (i.e. the number of days in accounts receivable, inventories and accounts payable) has a significant and negative impact on gross operating income. Likewise, based on a large sample of 3,786 U.S. companies, Kieschnick et al. (2011) argue that additional investments in offering credit to clienteles can bring great benefits in maximising the shareholders' wealth. Working capital is characterised by high liquidity. In light of this nature, the managers can control the working capital cycle (see Figure 1), adjust desired cash level of the firms, and then re-distribute

the dividend payout. Understanding the linkage between working capital and dividend payout can provide critical information for policymakers to further design an optimal payout policy. However, to the best of our knowledge, little evidence is documented on the impact of working capital on the dividend payout.

The primary objective of this study is to examine the impacts of the current earnings and working capital on the dividend payout. We use a sample of 1,575 firms listed on the London Stock Exchange for the period 1991 to 2015, and a Fixed-Effects model is used for the empirical analysis. We further use a Generalised Method of Moments (GMM) model to test the robustness of our results.

The study contributes to the literature on dividend payout in twofold. First, we re-measure the traditional (unadjusted) earnings and denote them as dividend-adjusted earnings (Div-adj Earnings) in our study. The traditional measurement of earnings may have a dispute with the dividend payout, while the re-measured Div-adj Earnings help tackle the issue and thus improve our model efficiency. Second, this is the first study that examines the impact of working capital on the dividend payout in the U.K. stock market. Previous studies have either independently linked the working capital to firms' performance, such as profitability or examined the relationship between earnings and firms' dividend payout (e.g., Lintner, 1956; Denis and Osobov, 2008; Ba?os-Caballero et al., 2014; Aktas et al., 2015). Two studies investigated the correlation between working capital and dividend payout (Oladipupo and Ibadin, 2013; Bushuru et al., 2015). However, these studies only focused on the African stock market. To the extent of our knowledge, very few studies have investigated the relationship between the working capital and dividend payout in the developed stock market.

The remainder of the paper is organised as follows. Section 2 describes the literature review. Section 3 introduces the methodology. Section 4 presents the results and discussions, and the conclusions are provided in Section 5.

2. LITERATURE REVIEW

2.1. Earnings/Profits and Dividend Payout

Earnings, as an essential point in dividend payout policy, have been extensively examined regarding firms' dividend payout in literature. There are two strands of literature that studied the relationship between the earnings and dividend payout. The first strand of literature focuses on the dividend signalling theory and states that the announcement of a firm's dividend payout conveys information that signals its future earnings. For example, a study based on the top 800 British firms showed that the dividend

payout has a significant and positive impact on future earnings (Dhanani, 2005). The results are similar to the findings of Howatt et al. (2009), who analysed the U.S. listed companies and found that the positive changes in dividend payout are positive and significantly correlated to the real changes in the earnings variable. However, a number of studies show little support for the dividend signalling theory. For example, based on a sample of the U.S. listed firms, DeAngelo et al. (1996) concluded that there is no evidence to support the dividend signalling theory. Similarly, Denis and Osobov (2008) performed a cross-country analysis and revealed that firms that issue dividends with greater earnings barely need the dividends to signal their future earnings. In addition, the study by Fukuda (2000), which investigated the dividend signalling theory in Japan stock market, demonstrated that an increase in the dividends leads to an increase in the earnings in the preceding years, but the earnings decrease in the subsequent year. In a more recent study on the emerging market of Thailand, Fairchild et al. (2014) also found no evidence to support the dividend signalling theory, and firms' dividend payout and earnings tend to exhibit a negative relationship in the long-run.

The second strand mainly relies on the dividend smoothing phenomenon. The study on the dividend smoothing was pioneered by Lintner (1956), who argued that the dividend payout is a function of the past and current earnings, and the earnings and dividends tend to smooth each other over years. Based on survey research, Brav et al. (2005) reported that 93.8% of managers are reluctant to decrease the dividend, and nearly 90% of them seek to maintain a smooth dividend payout. Jeong (2013) investigated the dividend smoothing behaviour in Korea and showed that the degree of dividend smoothing in Korean firms is less than that in the U.S. Moreover, several studies have shown that the dividend smoothing phenomenon is widely spread (e.g. Goddard et al., 2006; Javakhadze et al., 2014).

In a more comprehensive study, Basse et al. (2014) examined the European banks' dividend payout using a vector error correction model and argued that there is no empirical evidence to support either the dividend signalling or dividend smoothing during economic recessions.

A firm's dividend payout policy is usually announced after releasing the earnings report. Therefore, the variable representing current earnings in the previous studies partially incorporates the dividend payout. This issue is specified as follows:

Assume that a firm's dividend payout (D_{it}) is regressed as a function of earnings (P_{it}, profits after tax) and other determinants ($\sum_{j=1}^{k} c_j X_{jit}$, k

control variables, such as firm size and leverage):

$$D_{it} = a + bP_{it} + \sum_{j=1}^{k} c_j X_{jit} + e_{it} \ (t = 1, 2, 3, \ldots, T) \tag{1}$$

In some previous studies (e.g., Lintner, 1956; Fama and French, 2001; Denis and Osobov, 2008; Skinner, 2008), the coefficient representing b is used to capture the direct effect of the current earnings on the dividend payout. However, the P_{it} variable used in those studies incorporate the dividend payout. Failing to subtract the redundant information in the current earnings variable tends to produce biased estimates with respect to the impact of current earnings on the dividend payout. For this reason, we employ the Div-adj Earnings, which is measured as the profits after tax minus any declared dividends and other adjustments, to provide a more robust estimation.

For analytical purposes, we further assume that the firm's dividend payout ratio is r_{it} at t period. By substituting D_{it} with $r_{it}P_{it}$ into equation (1), we obtain:

$$D_{it} = a + b[D_{it} + (1 - r_{it})P_{it}] + \sum_{j=1}^{k} c_j X_{jit} + e_{it} \quad (t = 1, 2, 3, \ldots, T) \tag{2}$$

By re-arranging equation (2), we can subsequently obtain equations (3):

$$D_{it} = \frac{a}{1-b} + \frac{(1 - r_{it})b}{1-b} P_{it} + \sum_{j=1}^{k} \frac{c_j}{1-b} X_{jit} + \frac{e_{it}}{1-b} \quad (t = 1, 2, 3, \ldots, T) \tag{3}$$

Equation (3) can be rewritten as:

$$D_{it} = \hat{a} + \hat{b}P_{it} + \sum_{j=1}^{k} \hat{c_j} X_{jit} + \hat{e}_{it} \quad (t = 1, 2, 3, \ldots, T) \tag{4}$$

where $\hat{a} = \frac{a}{1-b}$, $\hat{b} = \frac{(1-r_{it})b}{1-b}$, $\hat{c_j} = \frac{c_j}{1-b}$ and $\hat{e} = \frac{e_{it}}{1-b}$. In particular, $\hat{b}$ in the equation (4) represents the modified coefficient of the Div-adj Earnings which the current study seeks to estimate. Besides, a modified measurement of earnings also improves the estimation of coefficients on other regeressors $\hat{c_j}$, constant $\hat{a}$ and error term $\hat{e}$.[1]

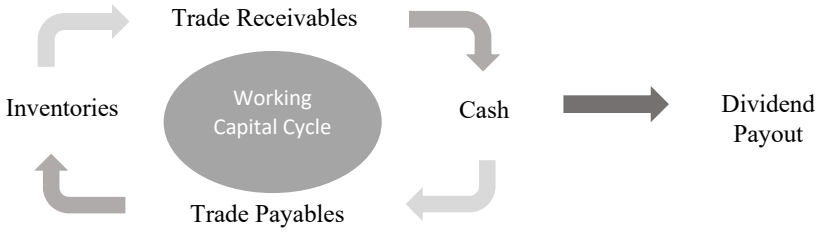
2.2. Working Capital, Profitability and Dividend Payout

[1]For comparison purpose, the coefficient b in equation (1) is also estimated in the empirical analysis.

Working capital, calculated as total current assets minus total current liabilities, is often used as an indicator of firms' liquidity. It serves as a prerequisite to ensure that the firms can meet their short-term obligations. Based on an analysis of 15 large manufacturing firms in the U.S., Fazzari and Petersen (1993) found that the working capital, as a source of liquidity, can be used to smooth the fixed investment relative to cash flow fluctuations for financially constrained firms. Similarly, Ding et al. (2013) who examined a large sample of 116,000 Chinese firms, showed that working capital could be used to alleviate the cash flow shocks on fixed capital investment. Using a dynamic research and development (R&D) model with panel data for the public listed firms in the U.S., Brown and Petesen (2011) highlighted that the cash reserve, which is an essential component of working capital, can smooth the R&D expenditures, especially for financially constrained firms.

With respect to the relationship between working capital and firms' performance, Shin and Soenen (1998) analysed a large sample of 58,985 firms and found that the days in the net trade cycle are negatively correlated with the firms' profitability. Based on 8,872 Spanish SMEs, Garcia-Teruel and Martinez-Solano (2007) conclude that reducing the cash conversion cycle increases firms' profitability, and managers could add great value to the firms by decreasing days of trade receivables and inventories. In an investigation for the Finnish listed firms, Enqvist et al. (2014) claimed that an effective working capital management would improve the firms' profitability significantly. Some analysts have also attempted to examine the nonlinear relationship between working capital and firms' performance. For example, Aktas et al. (2015) revealed that firms pursue optimal working capital by changing the level of working capital, which can improve share performance. Other studies also found an "inverse U-shape" relationship between the working capital and firms' profitability (Banos-Caballero et al., 2012 and 2014; Afrifa, 2016). A question raised: does working capital apply to dividend payout as well?

FIG. 1. Theoretical Framework between Working Capital and Dividend Payout



A firm's dividend payout policy highly involves "How much of net earnings should pay to its shareholders?" Thus, earnings are widely discussed

in terms of "should" when designing the dividend payout. However, paying dividends to the shareholders is another scenario[2]. It is cash that determines "How much a firm can pay to its shareholders(if a dividend payout policy is declared)?" Therefore, cash is more concerned with "can" after dividend declaration. This is because the majority of firms in this world adopt the accrual accounting basis, which results in differences between theirs' reported net earnings and actual cash holdings. In short, earnings only indicate how much of a firm should consider in dividend payout, whereas cash directly measures the ability to pay dividends. Literature also reveals that cash is critical in determining a firm's dividend payout (Guay and Harford, 2000; Javakhadze et al., 2014; Fairchild et al., 2014). Moreover, cash, as the most liquid asset, is an important component in working capital. As known, working capital involves current assets and current liabilities, which are classified as the most liquid accounting items in the Balance Sheet. In other words, other components in working capital (such as trade receivables/payables) can be converted to cash within a short time. Due to the high liquidity of working capital and its significant impact on firms' performance, it is reasonable to assume that firms are able to adjust desired cash level via controlling the working capital cycle, and re-distribute the dividend payout. Figure 1 shows how the working capital may affect the dividend payout. Next, we discuss two working capital scenarios:

2.2.1. A Low Working Capital Scenario

A low (net) working capital level may indicate that a firm has relatively lower current assets and relatively higher current liabilities. Specifically, firms with lower current assets show that cash, trade receivables, and inventories are at a low level, whereas higher current liabilities show that trade payables and other short-term debts are high. A low cash level may indicate that a firm's cash conversion cycle is too long. This is not favourable for firms facing potential risks and the firms may liquidate their assets to make payments (Opler et al., 1999; Mun and Jang, 2015). This suggests that the firm's available cash to use is too short. Low trade receivables indicate that a firm has collected the payment from its clienteles (Mun and Jang, 2015). Low inventories show that a firm has sold most of its inventories that reduce inventory holding costs (Alfares, 2007). High trade payables and other short-term debts reveal that a firm has a large number of debts (that is due within a short period) to pay off. Therefore, either a lower level of current assets or a higher level of current liabilities demon-

[2]Stock dividend is not discussed in the context of the current study.

strates that a firm may have less cash and more obligations to clear, and eventually it becomes an obstacle for the firm to issue cash dividend.

2.2.2. A High Working Capital Scenario

A high (net) working capital level may indicate that a firm has relatively higher current assets and relatively lower current liabilities. Higher current assets show that a firm's cash, trade receivables, and inventories are at a high level, whereas lower current liabilities show that trade payables and other short-term debts are low. On the one hand, a high cash level often indicates a positive cash flow, which facilitates the firms' future sales growth (Hill et al., 2010). Firms with higher cash grow faster and tend to have more investments and higher market to book ratio (Mikkelson and Partch, 2003). A high level of trade receivables suggests that a firm has extended new market and built the supplier-customer relationship (Wilson and Summers, 2002). Holding considerable amounts of inventories can reduce the supply costs and avoid loss of sales when demand is high (Blinder and Maccini, 1991; Fazzari and Petersen, 1993). On the other hand, low trade payables and other short-term debts reveal that a firm has paid most of its debts due in the short period. Thus, we assume that a relatively higher working capital can be a great potential source for the dividend payout.

However, when the working capital is too high, the situation may change. A high level of trade receivables may suggest that more sales are on credit, which reflects the lack of cash as well as a potential credit risk (Bougheas et al., 2009; Martínez-Sola et al., 2013). Holding a large number of inventories may indicate that the inventories cannot be sold easily or most are returned (Buzacott and Zhang, 2004). If a firm has considerable cash in its working capital, the firm may have a higher propensity to consider new investments, merger and acquisitions (M&As), R&D expenditures, etc (Mikkelson and Partch, 2003), rather than to issue dividends. Alternatively, an extremely high working capital does not necessarily mean that a firm has considerable cash, but a greater level of trade receivables and a larger number of unsold inventories. Therefore, in either case, the firm may not be able to utilise the working capital as a source for the dividend payout, holding the current liabilities unchanged.

In summary, the working capital appears to exhibit an "inverse U-shape" impact on the dividend payout. We hypothesise that the dividend payout increases as the working capital increases until the working capital reaches a certain level, and then it declines when working capital is beyond that per cent.

3. METHODOLOGY

3.1. Data

The data employed in this study are obtained from the annual reports filed by all firms listed on the London Stock Exchange (LSE) over the period from 1990 to 2015. The firms that do not have complete financial records and those that do not pay any dividend are excluded from the study. To eliminate the outliers' effect, all variables are winsorised at the 1% significance level. Furthermore, firms with less than 5 years of consecutive variables are dropped as well. This yields 1,575 firms in the overall sample — an unbalanced panel data for the study period. All the data are acquired from the Bloomberg and World Bank.

3.2. Variables Specification

The primary objective of this study is to estimate the effect of earnings and working capital on the dividend payout.[3] In particular, the dividend payout (Div) is measured as the total common cash dividend payout (Bloomberg IS052), which includes the regular cash as well as special cash dividends for all classes of common shareholders.[4] It is scaled down by firms' total assets.

With respect to the measurement of current earrings, previous studies have employed different indicators, such as return on assets, net earnings after tax, and net income plus interest expense (e.g., Skinner, 2008; Von Eije and Megginson, 2008; Fatemi and Bildik, 2012). However, as discussed previously, the current earnings variable incorporates the dividend payout, which should be subtracted to obtain more consistent and unbiased estimate. Therefore, the Div-adj Earnings, which is defined as the net income after tax minus any declared dividends and other adjustments and scaled down by firms' total assets, are used to measure firms' current earnings. The working capital variable (WC) is calculated as the net working capital in current year minus the net working capital in last year and then divided by the net working capital in last year.

We control for taxation, leverage, market-to-book ratio, firm size and GDP growth, following previous studies (Denis and Osobov, 2008; Fridson and Alvarez, 2011; Alzahrani and Lasfer, 2012). In particular, Tax (Tax) is defined as the tax amount paid in cash, which includes actual cash paid

[3]Owing to the small number of firms that issue stock dividends, the stock dividend is adjusted to cash dividend.

[4]When dividends during the period are not disclosed, they are estimated by multiplying the dividend per share (Bloomberg IS151) and by the weighted average number of outstanding shares (Bloomberg BS081).

for income taxes and net of any tax refunds, and is deflated by total current liabilities.[5] This variable is used mainly because taxation has been considered as a significant factor that leads to a decrease in firms' dividend payout (Alzahrani and Lasfer, 2012). Gearing ratio (Gearing), which is also known as leverage, is calculated by dividing its long-term debt (Bloomberg BS051) by common stockholders' equity (Bloomberg RP010). It is an effective financial indicator that reveals a firm's capital structure (Fridson and Alvarez, 2011). Following Denis and Osobov (2008), we include the market to book ratio (MtB) as a proxy variable to measure firms' growth opportunity. MtB is a measure of the relative value (Bloomberg RP010) of a company, compared to its market value (Bloomberg RP902). Similar to Alzahrani and Lasfer (2012), we define the firm size (Size) as the logarithm of the book value of net sales. Finally, the variable representing GDP growth rate (GDPg) is included to control for the macroeconomic conditions.

3.3. Empirical Specifications

In specifying our empirical model, we begin with the classic model of Lintner (1956) who argues that earning is a major factor that changes the dividend payout. The model is specified as follows:

$$Div_{it} = \alpha_0 + \alpha_1 P_{it} + \alpha_2 Div_{i(t-1)} + v_{it} \tag{5}$$

where Div_{it} and $Div_{i(t-1)}$ represent the dividend payout at time t and that at time $t-1$, respectively. P_{it} is the firm's profits after tax. α_1 and α_2 are the estimated coefficient parameters, α_0 is a constant, and v_{it} is an error term.

Due to the measurement issue in the current earnings variable in previous studies, the Div-adj Earnings variable is used in our study. Given the close relationship between the working capital and firms' performance (Baños-Caballero et al., 2012; 2014), we also include a variable representing working capital (WC) and its squared term (WC?) to capture the effects of the working capital on the dividend payout in our empirical model:

$$\begin{aligned} Div_{it} &= \beta_0 + \beta_1 Div_{i(t-1)} + \beta_2 Div - adjEarn_{it} + \beta_3 WC_{it} + \beta_4 WC_{it}^2 \\ &+ \beta_5 Tax_{it} + \beta_6 Gearing_{it} + \beta_7 MtB_{it} + \beta_8 Size_i t + \beta_9 GDPg_{it} \\ &+ \beta_{10} Dum(Industry)_{it} + \beta_9 Dum(time)_{it} + \mu_{it} \end{aligned} \tag{6}$$

[5] Unless refunds exceed taxes paid, the number will be positive.

where Div_{it} and $Div_{i(t-1)}$ represent the cash dividend payout at times t and $t-1$, respectively, Div-adj $Earn_{it}$ refers to the dividend-adjusted earnings. WC_{it} and WC_{it}^2 represent the working capital and its squared term at time period t, respectively. Tax_{it}, $Gearing_{it}$, MtB_{it}, $Size_{it}$, and $GDPg_{it}$ are the control variables, as defined previously.[6]

Fixed-Effects (FE) and Random-Effect (RE) models, which control for firm-specific heterogeneity are used to estimate our panel data. The results obtained from the Hausman specification tests show that the chi-square value of 962.23 is statistically significant at the 1% level. The finding suggests we reject the null hypothesis that the difference between random and fixed coefficients is not systematic, confirming that a fixed effect specification that controls for individual-level effects is appropriate in our study.

Given the multicollinearity issue could violate the model's estimation (Wooldridge, 2015), we adopt the Variance Inflation Factor (VIF) approach to test the severity of multicollinearity in the model. The VIF test shows that the largest value is 2.570 (less than 5) for the variable representing WC^2, indicating that there is no multicollinearity among the variables in our model.

4. RESULTS AND DISCUSSIONS

4.1. Descriptive Results

Table 1 presents the descriptive statistics of firms' average dividend payout in value and per cent (over total assets). Overall, the mean of dividend payout over total assets has a downward trend. It reports a flat move in the early 1990s and reaches to its peak of 2.919% in 1994. Two significant drops were observed in 2005 and 2008, subsequently followed by the lowest value of 1.347% in 2011. Afterwards, the average dividend payout (over total assets) goes up gradually to 1.642% in 2013 and nearly 2% in 2015. However, the mean of dividend payout in value shows a clear upward tendency. In particular, it has increased significantly from 34.836 billion in 1991 to £127.118 billion in 2015. Table 1 also reveals that the average dividend payout in value and per cent share some similar movements. For example, both of them decline significantly in 2008 and report an increasing trend from 2002 to 2004 and from 2011 to 2015. In a word, the mean of dividend payout over total assets reports a relatively fluctuated movement while firms' average dividend payout in value increases steadily over the analysed period.

[6]More information on the variables are presented in Table 7 in the Appendix.

TABLE 1.

Descriptive statistics of dividend payout from 1991 to 2015

		Dividend payout (in Billion GBP)		Dividend payout over Total Assets	
Year	N	Mean[1]	S.D.[1]	Mean[2]	S.D.[2]
1991	206	34.836	136.225	2.883%	0.023
1992	231	30.911	113.165	2.828%	0.023
1993	249	30.597	107.184	2.879%	0.023
1994	328	30.814	113.333	2.919%	0.041
1995	380	40.362	174.464	2.763%	0.04
1996	435	41.028	217.823	2.774%	0.029
1997	480	44.865	220.823	2.754%	0.036
1998	515	45.399	241.938	2.637%	0.029
1999	566	50.152	251.815	2.200%	0.035
2000	607	55.325	300.925	1.920%	0.03
2001	647	56.491	322.851	1.721%	0.026
2002	679	65.814	378.615	1.697%	0.026
2003	721	73.843	432.3	1.772%	0.049
2004	816	85.757	658.35	1.867%	0.12
2005	922	72.643	497.333	1.646%	0.063
2006	1024	77.567	550.053	1.782%	0.04
2007	1123	83.523	600.644	1.805%	0.285
2008	1188	70.857	552.366	1.426%	0.416
2009	1223	96.866	1322.55	1.387%	0.114
2010	1295	112.809	1738.89	1.442%	0.082
2011	1395	126.415	1963.51	1.347%	0.037
2012	1452	97.731	889.647	1.485%	0.045
2013	1490	126.456	1427.16	1.642%	0.349
2014	1518	121.862	1763.96	1.726%	0.043
2015	1368	127.118	1702.88	1.962%	0.049

Note: N shows the number of firms issue cash dividend payout over time. The means (S.Ds) represent the weighted average (standard deviations) of all sample firms' dividend payout in volume and in per cent, respectively for the period of 1991 to 2015.

Table 2 reports the mean and standard deviation of the dividend payout, unadjusted earnings, div-adjusted earnings and working capital variables in FTSE sectors. It illustrates that firms in the telecommunication sector issue the highest dividend payout (with a mean value of 3.8%), followed by the sector of consumer service, industrials, consumer goods, utilities, etc. Firms in the health care sector pay the smallest dividend payout (less than 1%). Surprisingly, one can find that the unadjusted earnings display negative values in all sectors. The unadjusted earnings in the industrials sector show the maximum value of -0.2%, whereas the minimum of -30.6% is ob-

TABLE 2.

Dividend payout, earnings and working capital by industry from 1991 to 2015

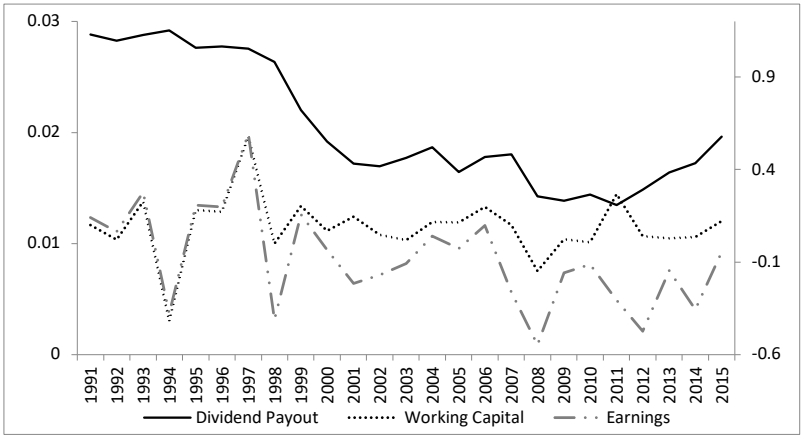
Sector	No. of firms	Div	Div-adjusted Earnings	Unadjusted Earnings	WC
		mean (s.d.)	mean (s.d.)	mean (s.d.)	mean (s.d.)
Basic Materials	177	0.010	−0.273	−0.262	0.065
		(0.059)	(0.638)	(0.638)	(4.225)
Consumer Goods	110	0.025	−0.029	−0.005	0.176
		(0.097)	(0.308)	(0.304)	(3.177)
Consumer Service	232	0.028	−0.048	−0.021	0.008
		(0.054)	(0.359)	(0.365)	(3.667)
Financials	337	0.023	−0.080	−0.060	0.121
		(0.243)	(0.402)	(0.400)	(3.575)
Health Care	109	0.010	−0.306	−0.295	0.307
		(0.023)	(0.621)	(0.625)	(3.920)
Industrials	301	0.025	−0.027	−0.002	0.021
		(0.039)	(0.273)	(0.279)	(3.014)
Oil & Gas	123	0.015	−0.201	−0.194	0.120
		(0.353)	(0.508)	(0.503)	(4.167)
Technology	144	0.022	−0.169	−0.150	0.087
		(0.224)	(0.512)	(0.514)	(3.912)
Telecommunication	21	0.038	−0.127	−0.088	−0.123
		(0.065)	(0.474)	(0.489)	(5.237)
Utilities	21	0.024	−0.048	−0.023	0.173
		(0.042)	(0.310)	(0.314)	(4.038)
Total	1,575	0.022	−0.107	−0.087	0.083
		(0.160)	(0.439)	(0.441)	(3.635)

Note: All firms are classified into ten sectors according to the FTSE sector on the LSE. Mean refers to the average and of Div, Div-adjusted Earnings, Unadjusted Earnings and WC variables. Standard deviations (S.D.) of the mean are presented in parentheses.

served in the health care sector. Apart from the telecommunication firms, it appears that firms in the sector with higher dividend payout turn out to generate more unadjusted earnings. The div-adjusted earnings show similar results compared to the unadjusted earnings. However, the increase in working capital presents an opposite situation. Firms in health care with the lowest dividend payout and earnings demonstrate the highest growth in working capital (around 30.7%). High increases in working capital are also found in the consumer goods and utilities sectors that report relatively high dividend payout and earnings. Interestingly, firms in the telecommunication and consumer service sectors which pay enormous dividends indicate

low growth in their working capital, especially in the telecommunication sector with the lowest value of −12.3%.

FIG. 2. Dividend payout, earnings and working capital from 1991 to 2015



Note: Dividend payout (*Div*) is calculated as total common cash dividend divided by total assets. Working capital (*WC*) refers to the increase in working capital in percentage. Earnings (*Unadjusted Earnings*) are shown as total profit after tax divided by total assets.

The movements of dividend payout, earnings and working capital from 1991 to 2015 are displayed in Figure 2. The figure shows that the dividend payout exhibits a slowly descending pattern from1991 to 2011 and start to increase afterwards. In comparison, the working capital and earnings show more fluctuations over the analysed period. The working capital increases dramatically from −41.8% in 1994 to the highest of 58% in 1997 and drops considerably to nearly zero in 1998. The earnings nearly share an exact movement compared to working capital in the early 1990s. The up and down movements of the dividend payout, earnings and working capital are similar from 2002 to 2008. In particular, all variables decline significantly in 2008 when the global financial crisis hit the U.K. economy strongly. The dividend payout continues to decline until 2011, while the working capital starts to rise from 2008 to 2011 and the earnings move up and down after 2008. Generally, the information demonstrated in Figure 2 neither reveal a clear relationship between dividend payout and earnings nor cast enough evidence of working capital in explaining dividend payout.

Table 3 presents the descriptive statistics of the variables used in the empirical analysis. The table shows that the mean of Div is 0.018. This suggests that on average, firms listed on the LSE only issue 1.8% of their total assets as cash dividends. Interestingly, the minimum and median

TABLE 3.

Summary Statistics of Model Variables (1991 to 2015)

Variables	N	Mean	Min.	Median	Max.
Div	20,858	0.018	0.000	0.006	0.164
		(0.028)			
Div-adj Earnings	20,858	−0.107	−3.057	0.011	0.309
		(0.439)			
Unadjusted Earnings	20,858	−0.0867	−3.032	0.274	0.358
		(0.441)			
WC	17,966	0.467	−8.711	0.058	22.700
		(3.304)			
Tax	19,718	0.041	−0.423	0.007	0.544
		(0.112)			
Gearing (%)	19,391	42.574	0.000	7.810	669.601
		(94.349)			
MtB (%)	18,295	2.763	−11.214	1.657	30.094
		(4.659)			
Size	18,836	4.060	1.210	4.111	13.603
		(2.947)			
GDPg (%)	25	2.044	−4.192	2.586	4.024
		(1.786)			
Total Assets	20,858	7,370.173	0.0002	69.165	2,692,538
		(79,807.3)			

Note: Standard deviations of the mean are presented in parentheses. All the firms' specific variables are winsorised at the 1% level, except for the Total Assets variable.

values of Div are 0.0% and 0.6%, respectively, indicating that a considerable number of firms issue zero or fewer dividend over the period analysed. These findings are consistent with those presented in Table 1. The WC with a mean value of 0.467 and a standard deviation of 3.304 indicates a slightly more volatile position. The minimum value of WC is −8.711, and the negative change could result from a number of financial behaviours, such as the increase in short-term borrowing and decrease in cash flow. The Div-adj Earnings, however, display a negative mean value of−0.107, which suggests that, on average, the dividend-paying firms issue more cash as dividends than what they earned in the same financial period. Another possible explanation is that firms paying no dividend reported negative earnings (losses).

The mean Tax is 4.111, suggesting that firms' tax liabilities paid in cash over the total current liabilities are around 4.1 percent. The Gearing has a mean value of 42.574, which represents the firms' ratio of long-term debts

to total common equity is around 42.57%. The minimum and maximum values of Gearing are 00.00 and 669.60, respectively, which shows that firms listed on the LSE have a different preference for debt and equity financing. The mean value of MtB is 2.763. This shows that on average market capitalisation of firms is 2.763 times over their book value, which suggests a healthy growth opportunity. The mean and standard deviation of the Size are 4.06 and 2.947, respectively.

4.2. Empirical Results

4.2.1. Overall Sample Results

Table 4 reports the results for the impact of (both div-adjusted and unadjusted) earnings and working capital on the dividend payout. In particular, the dividend-adjusted earnings are used in Model 1, while the unadjusted earnings are included in Model 2 for the purpose of comparison. The FE model that controls for firm-level heterogeneity is used to estimate Models 1 and 2.

In terms of the variables of interest, Model 1 shows that the Div-adj Earnings variable has no statistically significant impact on the dividend payout. The finding is similar to the findings of Farsio et al. (2004) who also find an insignificant correlation between the earnings and dividend payout.

The coefficient of WC is positive and statistically significant, and its squared term (WC^2) is negative and statistically significant in Model 1, suggesting that there exists an "inverse U-shape" relationship between the working capital and dividend payout.[7] Figure 3 demonstrates that an increase in working capital increases the dividend payout with the maximum effect occurring at 4.80 per cent. However, when an increase of working capital exceeds 4.80 per cent, dividend payout starts to decline.[8]

As discussed previously, an increase in the working capital may result from an increase in cash, trade receivables, inventories and a decrease in short-term debts. Thus, the increase in cash via working capital can be a source for the dividend payout, which explains the positive correlation between the working capital and dividend payout in the beginning.

[7]The findings of nonlinear (inverse U-shape) relationship are not sensitive to the choice of the test variables (increase in working capital or working capital level).

[8]Holding all the control variables constant (C), the simplified equation of Model 1 in Table 4 can be re-written as: $Div_{it} = 0.173WC_{it} - 0.018WC_{it}^2 + C$. Taking derivate of equation $0.173WC_{it} - 0.018WC_{it}^2$ regarding to WC_{it} variable yields $0.173 + 0.036WC_{it}$. Next, let $0.173 - 0.036WC_{it}$ equals to 0, therefore the turning point is around 4.8055.

TABLE 4.

Regression Results: FE model estimation

	Model 1		Model 2	
Variables	Coefficients	t-statistics	Coefficients	t-statistics
Div_{t-1}	0.449***	17.01	0.445***	16.98
	(0.026)		(0.026)	
Div-adj Earnings	−1.375	−0.90		
	(1.535)			
Unadjusted Earnings			3.912**	2.54
			(1.542)	
WC	0.173**	2.34	0.137**	1.88
	(0.074)		(0.073)	
WC^2	−0.018**	−2.05	−0.017**	−1.85
	(0.009)		(0.009)	
Tax	25.630***	9.03	24.452***	8.74
	(2.837)		(2.797)	
Gearing (%)	−0.027***	−8.83	−0.026***	−8.81
	(0.003)		(0.003)	
MtB (%)	0.601***	8.07	0.649***	8.79
	(0.074)		(0.074)	
Size	0.666***	3.62	0.478***	2.62
	(0.184)		(0.182)	
GDPg (%)	−0.714	−1.11	−0.511	−0.80
	(0.646)		(0.641)	
Constant	10.444***	7.72	11.057***	8.27
	(1.352)		(1.336)	
F-statistic	27.70***		27.76***	
Within R-square	28.05%		28.24%	
Number of observations	14,221		14,221	
Time fixed effect	Yes		Yes	
Firm fixed effect	Yes		Yes	
Industry-time effect	Yes		Yes	

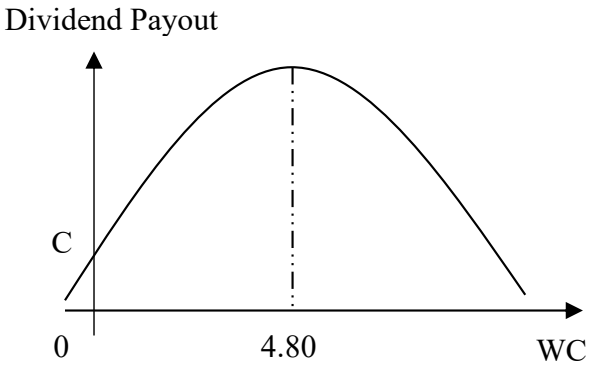
Note: The results presented in Models 1 and 2 are estimated based on equation (6). However, the dividend-adjusted earnings are included in Model 1, while the unadjusted earnings are included in Model 2.

** and *** represent significance at the 5% and 1% levels, respectively.

However, an extremely high net working capital may result from a high level of trade receivables, inventories, and a relatively low level of cash.[9]

[9]After screened out low dividend-paying firms with high working capital, we discover that these firms show higher inventories compared to their cash balance on average. For example, Tate & Lyle Plc reports less than 5% cash out of total current assets in some

FIG. 3. "Inverse U-shape" relationship between the working capital and dividend payout



This suggests that a firm with relatively small cash has a low efficiency in collecting receivables and stocked many unsold inventories. Thus, it is unlikely that the firm will adjust the working capital and maintain more cash in such a situation, resulting in a decrease in dividend payout. On the other hand, if the extremely high net working capital is mainly caused by a substantial increase in cash, then a firm is most likely to consider other financial decisions, such as investments, M&As, and R&D expenditures (Mikkelson and Partch, 2003). Subsequently, the working capital would decrease, and eventually, the dividend payout would decrease as well. To conclude, when the WC is greater than the turning point (i.e. 4.80), it has a negative impact on the dividend payout.

Turning to the other factors that influence the dividend payout, the results in Model 1 show that the lag dividend payout (Div_{t-1}) has a positive and significant impact on the current dividend payout (Div_t). The finding suggests that the dividend payout has a dynamic relationship (Javakhadze et al., 2014). The Tax has a positive and significant impact on the dividend payout, which suggests that firms that pay more tax paid in cash have a higher propensity to issue more dividends. The coefficient of MtB reports a positive sign and is significant at the 1% level. This suggests that the ratio of market capitalisation to asset book value is a key determinant of the dividend payout. The finding is similar to Tse's (2005) study. The Size coefficient is positive and significant at the 1% level, which implies

fiscal years. We also find that a small number of firms (such as Mail Ru. Group, SVI etc.) with considerable cash balance only pay small dividends. Firms like Mail Ru. even pay no dividend in some fiscal years.

that bigger firms tend to issue more dividend payout than smaller firms, which is consistent to the findings of Fama and French (2001) and Denis and Osobov (2008). The Gearing has a negative and significant effect on the dividend payout. A higher gearing ratio means higher long-term debts over total common equity, and therefore, firms have more debts to pay and fewer funds to distribute to shareholders (Aivazian et al., 2003; Benito and Young, 2003). Finally, we do not find that the GDPg has any significant effect on the dividend payout in our Model 1.

For comparison purposes, we also present the results that capture the effect of unadjusted earnings (profits after tax) on the dividend payout in Model 2 in Table 4. Our estimates show that the Unadjusted Earnings has a positive and statistically significant effect on the dividend payout. This is in line with previous literature (Linter, 1956; Howatt et al.,2009). However, the finding is different from the finding of Model 1 in Table 4, where the estimates using Div-adj Earnings are not adjusted. That is likely because the dividend payout information is included in the unadjusted earnings variable. The negative and insignificant coefficient of Div-adj Earnings could be explained by the fact that most of the firms' current earnings are insufficient to pay for their dividend payout (Ferris et al., 2006).

Combining the results, we confirm that both earnings and working capital variables[10] are important determinants in dividend payout. One possible interpretation of Div-adj Earnings is that earnings can be only regarded as an outline in designing dividend payout, but it does not reveal the ability of a firm in issuing actural dividends. However, working capital not only plays a critical role in designing dividend payout but also contributes to the actual dividends that a firm is able to pay.

With respect to other coefficients, we found similar signs and significance levels in Models 1 and 2.

4.2.2. Subsamples Results

Figure 3 shows an "inverse U-shape" relationship between the working capital and dividend payout, with a turning point of 4.8. Therefore, it is worthy to further investigate the effect of working capital on the dividend payout for the subsamples, appeared on the left side and right side of the turning point, respectively. The results in two subsamples: (1) positive group; and (2) positive and negative group. Specifically, the positive group refers to the 1,009 firms whose working capital is presented on the left

[10]Earnings and working capital refer to traditional (unadjusted) earnings and change in working capital respectively.

TABLE 5.
Regression results for Positive group and Positive and Negative group (FE model estimation)

Variables	Positive	Positive and Negative	Sig. of dif.
Div_{t-1}	0.453^{***}	0.435^{***}	0.332
	(0.033)	(0.043)	
Div-adj Earnings	-4.019	1.038	1.678^{*}
	(2.852)	(0.974)	
WC	0.363^{*}	0.068^{**}	1.256
	(0.216)	(0.092)	
WC^2	0.004	-0.003^{***}	0.022
	(0.317)	(0.005)	
Tax	32.832^{***}	14.728^{***}	3.310^{***}
	(4.004)	(3.727)	
Gearing (%)	-0.031^{***}	-0.023^{***}	1.249
	(0.005)	(0.004)	
MtB (%)	0.720^{***}	0.487^{***}	1.597
	(0.120)	(0.083)	
Size	1.113^{***}	0.322^{**}	2.014^{**}
	(0.328)	(0.216)	
GDPg (%)	-1.090	-0.501	0.425
	(0.811)	(1.123)	
Constant	9.746^{***}	10.145^{***}	0.131
	(1.789)	(2.471)	
F-statistics (p-value)	20.47^{***}	12.27^{***}	
Within R-square	30.10%	25.44%	
Number of Observations	8,758	5,463	
Number of Firms	1,009	566	
Time fixed effect	Yes	Yes	
Firm fixed effect	Yes	Yes	
Industry-time effect	Yes	Yes	

Note: The positive group refers to 1,009 firms with increases in working capital that are lower than the turning point, and the positive and negative group refers to the rest 566 firms with increases in working capital that are either greater or lower than the turing point in different observation years during the period 1991—2015. Standard errors are robust to heteroscedasticity. The significant difference in coefficients shows the absolute value of the z-test statistic, where $Z = (b_1 - b_2)/\sqrt{SE_{b1}^2 + SE_{b2}^2}$

*, ** and *** represent significance at the 10%, 5% and 1% levels, respectively.

side of the turning point from 1991 to 2015. The positive and negative group represents the rest 566 firms whose working capital is located on the right side of the turning point. We name it as positive and negative group

because the rest 566 firms whose working capital is located in the right side of the turning point also have working capital located in the left side of the turning point in some years.

The mean differences of the selected variables between the positive group and the positive and negative group are presented in Table 8 in the Appendix. Table 8 shows the mean value of WC in the positive group is -0.104 and 12.76 in the positive and negative group, with a mean difference statistically significant at 1% level. Here, we further investigate whether the "inverse U-shape" relationship between the working capital and dividend payout still holds in the two groups, and present the estimated results in Table 5.

The results presented in Table 5 show that the coefficients of WC and WC^2 report positive and negative values, respectively in both groups, which suggest that the "inverse U-shape" relationship between the working capital and dividend payout still exists in both groups. However, the coefficients of WC and WC^2 are only statistically significant in the positive and negative group (see Table 5). Similar to the results reported for the overall sample, the Div-adj Earnings has no statistically significant impact on the dividend payout in both the positive group and the positive and negative group. The findings with respect to the effects of control variables on the dividend payout are consistent with the findings in the overall sample.

Notably, the turning point (of WC) sets a rough benchmark for firms when holding all else constant. It is most likely that the number of firms in either group will change since a firm's working capital changes from time to time. If a firm's working capital drops below the turning point for some periods, then the firm will shift from the positive and negative group to the positive group and vice versa.

Table 5 shows that the working capital and its squared term for the positive group have no statistically significant impact on the dividend payout, whereas that for the positive and negative group affects the dividend payout significantly. To provide a better understanding regarding the relationship between the working capital and dividend payout, we further split the overall sample to investigate how different levels of working capital affect the dividend payout. For simplicity, we only report the results estimated from the subsamples that are classified based on the average working capital (i.e. below/above average working capital), firm size (i.e. large/small firms), and the average MtB ratio at the industrial level (i.e. high/low MtB), respectively. The characteristics of each subsample are presented in Table 9 in the Appendix. We re-estimate the equation (6) for these subsamples and present the results in Table 6.

TABLE 6.

Subsample analysis (Below average working capital vs. Above average working capital, Large vs. Small, and High MtB vs. Low MtB)

	Category (1)		Category (2)		Category (3)	
Variables	Below $\overline{WC}$	Above $\overline{WC}$	Large	Small	High MtB	Low MtB
Div_{t-1}	0.443***	0.355***	0.458***	0.383***	0.487***	0.304***
	(0.041)	(0.041)	(0.038)	(0.039)	(0.039)	(0.046)
Div-adj Earnings	0.995	−1.898	−1.867	−1.239	0.083	-8.162
	(1.168)	(2.613)	(1.579)	(1.613)	(1.617)	(5.102)
WC	0.152	0.265**	0.105	0.213**	0.074	0.195**
	(0.131)	(0.108)	(0.117)	(0.101)	(0.123)	(0.089)
WC^2	−0.001	−0.017***	−0.002	−0.012***	−0.005	−0.009**
	(0.008)	(0.005)	(0.007)	(0.005)	(0.008)	(0.004)
Tax	23.092***	32.919***	48.429***	16.561***31.615***	9.470***	
	(3.702)	(4.266)	(5.768)	(3.113)	(4.538)	(2.622)
Gearing (%)	−0.026***	−0.025***	−0.039***	−0.015***	−0.029***	−0.023***
	(0.005)	(0.004)	(0.005)	(0.004)	(0.005)	(0.005)
MtB (%)	0.658***	0.578***	1.133***	0.150**	0.728***	6.231***
	(0.119)	(0.132)	(1.152)	(0.073)	(0.106)	(0.683)
Size	0.588**	0.792	0.122***	0.955***	0.231***	0.420***
	(0.313)	(0.358)	(0.619)	(0.254)	(0.381)	(0.328)
GDPg (%)	−0.282	−0.028	−0.485	−1.643	−0.756	−0.834
	(1.218)	(1.063)	(0.858)	(1.787)	(1.137)	(0.879)
Constant	10.827***	10.017***	14.020***	11.017***	14.377***	4.320***
	(2.581)	(2.385)	(3.127)	(3.933)	(2.372)	(2.062)
F-Statistics (p-value)	12.66***	14.71***	22.74***	9.88***	15.80***	14.32***
Within R-square	26.49%	21.13%	34.67%	18.92%	33.34%	17.70%
Number of Observations	5,740	5,979	7,175	6,337	6,008	5,103
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Industry-time effect	Yes	Yes	Yes	Yes	Yes	Yes

Note: Categories (1), (2) and (3) are disaggregated from the overall sample via average WC at industrial level, firm size and average MtB at industrial level, respectively. Standard errors are robust to heteroscedasticity. ** and *** represent significance at the 5% and 1% levels, respectively.

Consistent with the results estimated for the overall sample (Table 4), the coefficient of Div-adj Earnings is not statistically significant in any subsamples. The coefficient of WC is positive and statistically significant, and the squared term (WC^2) is negative and statically significant in the subsamples including above the average working capital, small and low MtB. Apparently, the "inverse U-shape" relationship between the working capital and dividend payout still exists for firms in the subsamples.

The results suggest that firms with higher working capital (above average working capital, small and low MtB) are more capable of adjusting their dividend payout via working capital compared to their counterparts in the subsample.

4.3. Robustness test

For the robustness check, we re-estimated our results for the overall sample and subsamples using a Generalised Method of Moments (GMM) estimator.[11] The results show the Div-adj Earnings has no statistically significant effect on the dividend payout in all the estimated samples, and there exists an "inverse U-shape" relationship between the working capital and dividend payout (see Table 10 in the Appendix). The results estimated from the GMM estimator are quite similar to the results from the fixed-effects model (see Tables 4-6), confirming the effects of the earnings and working capital on the dividend payout have been consistently estimated in our study.

5. CONCLUSIONS

This study examines the effect of earnings and working capital on the dividend payout. Specifically, we adjust traditional earnings variable and re-examine its impact on the dividend payout; we also investigate whether there exists a nonlinear relationship between the working capital and dividend payout. The Fixed-Effects model was used to analyse a sample of 1,575 firms listed on the LSE from 1991 to 2015.

The empirical results show that the unadjusted earnings are significantly and positively correlated with dividend payout, while the adjusted earnings do not affect the dividend payout significantly. The results also reveal that the working capital affects the dividend payout significantly. In particular, we found there exists an "inverse U-shape" relationship between the working capital and dividend payout, and such effects also exist in the subsamples including the positive and negative group, above average working capital, small and low MtB. Taxation, market-to-book ratio and firm size significantly and positively affect the dividend payout whereas the gear-

[11] The two-step system GMM model is used for our robustness check. In particular, we used the dividend payout, gearing ratio, market to book ratio and working capital with lagged levels t-2 to t-3 as GMM instruments. The Hansen J test, difference-Hansen test, and auto-correlation (AR_2) are also presented in the lower part of Table 10 in the Appendix.

ing ratio affects the dividend payout negatively. Our results are robust to empirical specification, firm-specific heterogeneity, and time effects.

Our findings reveal that earnings are fundamental but should not be treated as a dominating factor when making dividend decisions. The results also highlight the importance of the "inverse U-shape" relationship between working capital and dividend payout. One should interpret the "inverse U-shape" relationship with caution since an increase/decrease in working capital may result from multiple reasons. Considering the dynamic of working capital, the static value of 4.80 in Figure 3 (or other values based on the alternative subsample analysis) should only be viewed as a rough threshold that might shift the dividend payout trend. Nevertheless, our study offers some conclusive evidence on the relationship between earnings and dividend payout. It also provides new insights into the value of working capital and suggests that it is highly necessary for managers to include working capital in their decisions to design corporate dividend payout policy. Future studies could examine whether the "inverse U-shape" correlation between the working capital and dividend payout exists in other stock markets, and what is the optimal level of working capital (with other financial variables) in designing a dividend payout policy.

APPENDIX

TABLE 7.

Variable definition and measurement

Abb.	Definitions	Measurements
Div	cash dividend payout	The cash amount distributed for common dividend divided by total assets
WC	increase in working capital	$(WC_t - WC_{t-1})/WC_{t-1}$
WC^2	increase in working capital square	$[(WC_t - WC_{t-1})/WC_{t-1}]^2$
Unadjusted Earnings	current earnings	Profits after tax divided by total assets
Div-adj Earnings	dividend-adjusted earnings	Profits after tax excluding any dividend declare and adjustments, and deflated by total assets
Tax	taxation	Tax paid in cash divided by total current liabilities
Size	firm size	Log value of net sales
Gearing	gearing ratio	Long-term debt/ total common equity
MtB	market-to-book ratio	Market Capitalisation/ Book Value
GDPg	GDP growth	The annual GDP growth in the U.K.
u	error term	Estimated error term

TABLE 8.

Firms' Characteristics (Positive group vs. Positive and Negative group)

	Positive		Positive and Negative		
Variables	Mean	N	Mean	N	t-statistics
Div	0.019	17,213	0.013	753	5.876^{***}
	(0.029)		(0.028)		
Div-adj Earnings	−0.104	17,213	−0.125	753	1.301
	(0.432)		(0.438)		
WC	−0.071	17,213	12.76	753	-170.000^{***}
	(1.581)		(6.749)		
Tax	0.044	17,211	0.023	753	5.103^{***}
	(0.115)		(0.098)		
Gearing (%)	40.413	16,110	35.945	692	1.275
	(90.643)		(81.769)		
MtB (%)	2.806	15,818	3.003	658	−1.046
	(4.733)		(4.847)		
Size	4.121	15,692	3.245	638	7.541^{***}
	(2.855)		(3.333)		
Total Assets	2,445.87	17,213	2,378.04	753	0.11
	(16,635.65)		(15,041.70)		
No. of firms	1,009		566		

Note: The positive group refers to 1,009 firms with increases in working capital that are lower than the turning point, and the positive and negative group refers to the rest 566 firms with increases in working capital that are either greater or lower than the turing point in different observation years during the period 1991-2015. The difference between the two samples is calculated as mean (positive group) minus mean (positive and negative group). t-statistic is based on the two-tail t-test.
*** represents significance at the 1% levels.

TABLE 9.

Characteristics of subsamples categorised by working capital industrial average, firms' age and LSE listing criteria

Categories	Subsamples	Definitions
Category (1)	Below $\overline{WC}$	Firms' net working capital are higher than the industrial average.
	Above $\overline{WC}$	Firms' net working capital are lower than the industrial average.
Category (2)	Large	Firm size are greater than the industrial average.
	Small	Firm size are smaller than the industrial average.
Category (3)	High MtB	Firms' market capitalisation to book ratio are less than the industrial average
	Low MtB	Firms' market capitalisation to book ratio are more than the industrial average

TABLE 10.

Overall and subsamples results: two-step system GMM estimation

Variables	Overall sample	Category (1) Positive	Category (1) Positive and negative	Category (2) Below average working capital	Category (2) Above average working capital	Category (3) Large	Category (3) Small	Category (4) High MtB	Category (4) Low MtB
Div_{t-1}	0.518***	0.467***	0.502***	0.519***	0.412***	0.466***	0.530***	0.610***	0.688***
	(0.043)	(0.049)	(0.056)	(0.066)	(0.062)	(0.052)	(0.063)	(0.052)	(0.055)
Div-adj Earnings	0.622	−2.773	3.543	3.430	0.433	−1.764	0.468	1.415	1.466
	(1.908)	(2.936)	(1.833)	(1.792)	(2.641)	(8.612)	(1.465)	(2.078)	(3.342)
WC	1.580***	1.952*	0.395**	0.431	1.407**	0.100	1.413**	0.852	1.264**
	(0.465)	(1.038)	(0.456)	(0.656)	(0.652)	(0.544)	(0.463)	(0.570)	(0.546)
WC^2	−0.106***	0.069	−0.027**	−0.030	−0.106**	−0.047	−0.107**	−0.046	−0.123***
	(0.035)	(0.148)	(0.028)	(0.029)	(0.043)	(0.040)	(0.031)	(0.044)	(0.055)
Tax	22.214***	35.388***	16.602***	26.455***	28.981***	49.950***	16.430***	33.962***	31.369***
	(3.970)	(5.803)	(4.991)	(5.885)	(7.017)	(8.022)	(4.336)	(6.569)	(5.367)
Gearing (%)	−0.047***	−0.069***	−0.037***	0.016**	−0.025***	−0.037**	−0.026**	−0.012**	−0.008***
	(0.012)	(0.015)	(0.012)	(0.296)	(0.012)	(0.012)	(0.012)	(0.007)	(0.014)
MtB (%)	1.202***	1.599***	1.212***	1.180***	1.326**	1.858***	0.781***	0.763***	0.889***
	(0.234)	(0.340)	(0.274)	(0.296)	(0.344)	(0.261)	(0.299)	(0.180)	(0.273)
Size	2.455***	2.774***	1.785***	1.293**	2.933***	1.304***	2.878***	1.498***	1.207***
	(0.649)	(0.738)	(0.585)	(0.653)	(0.823)	(1.136)	(0.832)	(0.528)	(0.463)
GDPg (%)	0.170	0.278	−1.128	0.496	0.271	−0.498	0.435	−0.271	−0.421
	(0.191)	(0.204)	(0.308)	(0.325)	(0.267)	(0.249)	(0.407)	(0.284)	(0.239)
Constant	−3.606***	−4.857	−7.384***	1.924	−4.435	−2.060**	−1.298	−1.820	−1.243
	(2.473)	(3.147)	(2.450)	(2.239)	(3.205)	(6.718)	(2.968)	(2.201)	(2.552)
AR_2 (p-value)	0.279	0.319	0.839	0.827	0.370	0.220	0.157	0.873	0.486
Hansen J-test (p-value)	0.256	0.104	0.106	0.162	0.286	0.149	0.539	0.498	0.537
Dif. Hansen test (p-value)	0.225	0.162	0.139	0.276	0.161	0.125	0.161	0.527	0.151
No. of Observations	14,221	8,758	5,463	5,740	5,979	7,175	6,337	6,008	5,103
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-time effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: Categories (1), (2), (3) and (4) are disaggregated from the overall sample via the turning point of WC, average working capital at industrial level, firm size and the average MtB at industrial level, respectively. Standard errors are robust to heteroscedasticity and within the firm's serial correlation. AR? is Arellano-Bond second-order test for serial correlation using residuals of first differences. Hansen J-test is a test of over-identifying restrictions. The Dif. Hansen test reports the exogeneity of instrument subsets.
*, ** and *** represent significance at the 10%, 5% and 1% levels, respectively.

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