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Swansea University
Prifysgol Abertawe

Behaviours of Low versus High Dividend-
paying Countries
With
The Sectorial Analysis

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Muharrem Can UNAL

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Abstract

During the past decade, corporate decisions on dividend policy have been taken as active coefficient that corresponds with reaction of sudden changes in the stock market as pointed out by Lintner (1956). This study aims to investigate the behaviours of dividends, corporate earnings and payout ratios in such specific circumstances. The speed of dividend adjustments are examined on a sectorial basis using the Lintner (1956) partial adjustment model applied on both high- and low-paying sectors of the DAX30 (Germany) and SBF120 (France) index. According to the analysis results, the findings can be concluded in three aspects. First, regardless of the severe financial crisis factors, majority of managers are reluctant to reduce or cut dividends. Second, the higher the target payout ratio the lower the speed of dividend adjustment is and, lastly, in contrast to the low dividend-paying sectors, high dividend-paying sectors have experienced higher earnings per share, on average, between 1995 and 2014.

1. Introduction

In 1956, Lintner's analysis and suggestions have brought fresh aspects on the determinants of dividend payouts. Lintner interviewed 28 chief executive officers (CEOs) and Chief Financial Officers (CFOs) in the US. In accordance with the interview results, firm's dividend payments are active coefficients on earnings because most of managers believed that dividend payment is a sort of premium and stable dividend payment plays a vital role on diminishing the investor's negative attitude. Then, the argument was supported by shareholders' desire for smoothed dividend payment. Furthermore, it is identified that the efficient target payout ratio is 50% and most managers aim for long-term dividend payout ratio with rapid adjustments to preserve target payout ratio. Following the data set construction with 50% target payout ratio, the *partial adjustment model* is developed.

Furthermore, Fama and Babiak (1968) examined the individual firms' dividend policies. The study tested the Lintner's partial adjustment model and found that earnings and lagged dividends performed well, in comparison with the rest of the models that were tested. It is found that removing the constant term and adding lagged earnings slightly enhanced the explanatory power of the model. Hence, Fama and Babiak's (1968) empirical results validated the partial adjustment model.

Behm and Zimmerman (1993) examined 32 large-cap¹ German companies by using the *partial adjustment model*. The time horizon under investigation was 1962-1988. They argued that the model is fairly fit for aggregate stock market and particular company data. More recently, Andres et al. (2009) have validated the partial adjustment model by using the panel data of 220 commercial and industrial companies listed in Germany between 1984 and 2005.

During the past decades, dividend payments have increasingly become more important in the corporate world. More importantly, several researchers have conducted the investigation using variations in the hypothesis on dividend adjustment. The partial adjustment model is an essential econometric model that specifies dividend reaction speed under the special circumstances, such as financially restrictive period whether companies rapidly adjusts the dividends by allowing dividend cut to reduce dividend

¹ Companies with relatively large market capitalisation in that particular market.

cost or reacting quite a bit slow and allow gradual increasing the dividend payments to raise confidence on investors.

In this study, the behaviours and influences of the dividend per share (DPS), earnings per share (EPS) and payout ratio will be closely examined in Germany (DAX30) and France (SBF120) as the case studies of the Eurozone countries. Also, these two countries can be considered as an economically well-established. Their particular role in Eurozone rendered these countries as favourable to reach aim of the research.

The firms under investigation are grouped into sectors and ranked from the highest dividend-paying sector to the lowest dividend-paying sectors in order to examine whether their dividend and earnings patterns differ or not. Subsequently, the aggregate results of the dividend behaviour in the stock markets will be examined using both graphs and the partial adjustment model for the analysis. The sectors that have been specifically chosen from high and low dividend-paying sectors will be studied to provide more in-depth understanding. Moreover, the aggregate stock market and specific sectors' speed of dividend reactions and managerial reluctance of dividend reduction will be tested by using the Lintner's *partial adjustment model*. In this study, the target payout ratios are assumed as 25%, 50% and 75% to test the influence of the target payout ratio over the speed of adjustment.

There are 120 shares in the SBF120 index (France). The study will conduct the investigation on dividend payment behaviours over three time windows: pre-crisis (2004-2006), core crisis (2007-2009) and post-crisis (2010-2014)².

In the two markets under study, as mentioned earlier, the companies are grouped on a sectoral basis and subsequently ranked from the highest dividend-paying to lowest dividend-paying sector³. Of note, financial companies have different accounting policies; therefore, real estate investment trust, nonlife insurance and real estate investment & services sectors are not included in this study. When the financial sectors are excluded, the top three leading sectors in terms of dividend payment level are general retailers sector, chemicals sector and food & drug retailers sector respectively. In this study, the general retailers sector is excluded from the analysis because, despite a

² See the figure 1 in appendix.

³ See table 1.

very high dividend payment, there exists only one company in this sector. Therefore, only food & drug retailers sector are included in the analysis. In contrast, the level of lower dividend-paying is observed in the leisure goods, support services and healthcare equipment & services sector. The healthcare equipment & services sector is observed to be highest dividend-paying sector in this group while the leisure good sector pays the lowest dividend. The leisure goods sector is the lowest dividend-paying sector with the average over the past five years as almost zero. In fact, this sector in France has paid no dividends in the last five years. Therefore, the leisure goods sector is excluded from the analysis of this study.

As mentioned earlier, Germany has been regarded as an important country in the Eurozone. There are 30 large-cap companies from 17 sectors, in DAX30 index (Germany). The sectors are ranked from higher dividend-paying sectors to lower dividend-paying sectors, in accordance with the average dividend payment between 1995 and 2014. In this study financial sectors are not included with same reason as mentioned earlier. Thus, only three sectors remained at the top of the list. These are gas, water & multi-utilities, automobile & parts and general industrials sector. The automobile & parts and general industrials sectors have been selected as high dividend-paying sectors. Even if, the average dividend of general retailers sector is smaller than gas, water & multi-utilities sector, the general retailers sector is more interesting. This is because; there are two large-cap companies with absolutely opposite dividend policy after the 2010. Thus, general retailers sector could be taken as an alternative to gas, water & multi-utilities sector. In the lower dividend paying group, technology hardware & equipment, software & computer services, travel & leisure and healthcare equipment & services sectors appear to pay dividend from the lowest to the highest.

Software equipment & computer services and healthcare equipment & services have been chosen as lower dividend-paying sector. The reason why healthcare and services sector have been selected can be explained as an enthusiasm of demonstration over the both countries, identically, low dividend-paying sectors analysis. In brief, automobile & parts and general industrials sector chosen as higher dividend-paying sector, meanwhile, software & computer services and healthcare equipment & services sector selected as lower dividend-paying sectors to provide in-depth analysis by using the Lintner's partial adjustment model.

This research has also conducted the investigation and analysis on the dividend behaviours of the UK (FTSE350) and US (S&P500) stock markets with same methodology. The empirical results illustrate that the findings of the UK (FTSE350) and US (S&P500) are consistent with Germany (DAX30) and France (SBF120) with regard to dividend adjustments speed. Due to the maximum word limit of thesis, the empirical results are not presented in this thesis but could be provided upon request. In previous studies, there has been a large amount of investigations on the dividend behaviours of UK (FTSE350) and US (S&P500) markets but there are only a few studies conducted on Germany (DAX30) and France (SBF120) as a case study. This study aims to provide more contribution of the empirical evidence on Germany and France as the investigation on these two countries is sparse.

In comparison, the dividend behaviour and speed of adjustment of Germany is much more similar to France whilst the dividend behaviour and speed of adjustment of the UK is much more similar to the US, rather than Germany and France.

To summarise, in regard to the target payout ratio and earnings, the speed of dividend adjustments caused conflicts during the economic downturn whether companies should immediately stop paying dividends or just slowly adjust dividend to build a confidence on investors. It has been commonly been argued in the literature and produced variety of hypothesis so that, this study aims to shed light on this conflict by using more recent data.

The research has structured as follow; the literature review of dividend smoothing and signalling theories and hypothesis with data & methodology will be presented in the chapter one. Subsequently, Germany and France will closely be analysed as a case studies of Eurozone countries, in chapter two. Finally, the analyses will be summarised in the last conclusion chapter.

2. Chapter I: Dividend Policy and Partial Adjustment Model

2.1 Literature Review

In the literature, there are numerous studies on the dividend behaviours and dividend hypothesis over the past decade. The literature on dividends has paid close attention to explain mystery of dividend puzzle. The dividend signalling theory was introduced in an attempt to explain dividend behaviours. It is argued that dividend payments are the sign of the high level of future earnings and/or confidence. Thus, the accurate prediction of future profitability is crucially essential for the firms over the payout ratio.

The pioneering work of dividend policy was examined by Lintner (1956). It is claimed that, dividend policy plays vital role on firm decisions. Lintner (1956) identified the target payout ratio as 50%. Moreover, the *partial adjustment model* was proposed by Lintner in 1956 and it explored the effects of dividend changes around 85% of explanatory power. Lintner (1956) aimed to identify efficient payout ratio by interviewing with 28 top management companies' decision makers. The results showed that, the efficient payout ratio is 50%, the partial adjustment model explained the speed of dividend adjustment and a lag of earnings and dividends. So, it is concluded that, a large number of the top management teams are reluctant to cut or omit dividends during the financially distressed times. Thus, in accordance with Lintner (1956), the change of dividends can be taken as a crucial tool that signals the future earnings. Subsequently, Lintner's (1956) partial adjustment model had tested by Fama and Babiak in 1968 and approved that the model is quite a bit accurate. Yet, it is claimed that, the partial adjustment model can still be improved and the test results presented that, the model is able to improve by removing the constant term and adding the coefficient of the lagged earnings. Additionally, the higher determination coefficient support the claim of Fama and Babiak's (1968). However, Fama and Babiak's (1968) validation and improvement cannot be takes as de facto, because, it has particularly examined the US market instead of expanding the research across the world markets. Following years, Shevlin (1982) also argued the validity of partial adjustment model and the results exhibited a strongly support on *partial adjustment model*. Moreover, Arnott and Asness (2003) investigated

the dividend policy over the US equity market with respect to the payout ratio. The empirical results of historical data analyses and robustness tests showed that, the lower current payout ratio indicates the lower earnings growth and higher payout ratio demonstrates higher earnings growth in regard to. In short, the statistically strong empirical results support the signalling theory.

However, there are also different aspects over the dividend signalling hypothesis. Fuller and Goldstein (2011) compared the performance of dividend-paying and non-dividend-paying firm by investigating S&P500 monthly return via Fama and French's three factor model with Fama-McBeth style regression analysis. The investigation showed that companies who pay dividends, performed better than non-dividend-paying companies by around 1% to 2%. Additionally, it is also stated that during the financial down turns, firms provide more dividends to shareholders. In other words, asymmetric behaviour of dividends can be seen in market turns and the firms that did not seize the dividends during the market down turns performed better than non-dividend-paying firms. Hence, the study can be taken as recent research that supports argument of Lintner (1956), which states that managers are reluctant to seize or omission the dividends during the financially distressed times. Previous to this research, Benito and Young (2002), Aivazian, Booth and Cleary (2006) supported the Litner (1956) efficient target payout ratio by testing *the partial adjustment* model.

According to Benartzi, Michaely and Thaler (1997), the firms that have increased dividends, experienced a large amount of excessive returns for the next three years. So, it is stated that, Lintner's (1956) *partial adjustment model* prevails as outstanding explanation dividend adjustment process. Following that, Julio and Ikenberry (2004) found that companies need to signal a confidence that based upon the dividends. The investigation results showed that, the dividends have smoothed since 2000 and more importantly, dividend payments were not seized in spite of the negative earnings of aggregate stock markets in 2001, which caused by the *dot.com* crisis. In brief, it is concluded that dividends can only be taken as the tool of information conveying to increase confidence on investors.

Gwilym et al. (2006) has found evidence for US market and stated that, a large amount of dividend payment corresponds to the higher growth of real earnings. In details, the study extend the prior research by testing correlation of 11 international

stock markets by taking into payout ratio, expected real growth of returns and dividends. Notably, the strong correlation is only identified between payout ratio and expected real earnings growth rather than growth of real dividend. On the following dividend research of Gwilym et al. (2009) reported that dividend growth is important indicator of firms performance. The analysis results are interpreted that, steady dividend-paying s have outperformed. Additionally, researchers have examined the relationship between momentum and dividend yield and found that zero dividend-paying s experienced the worst performance in terms of stock prices. Subsequently, the bull and bear markets are investigated and found that the dividend yields are outperforming with a bear market (Gwilym et. al., 2012).

Hussainey (2009) reported the dividend signalling hypothesis by testing the change of dividends influence on recent return of stock and expected earnings. There are three main interpretations is stated in the research. Firstly, the change of dividends, expected earnings and recent returns are interconnected. Secondly, the dividend-paying companies demonstrates higher stock price in comparison with stock price of non-dividend-paying companies. Finally, the expected earnings growth is reported as higher for loss making companies as related to dividend payments. In other words the companies those have paid dividends, in financially restrictive time, reported higher earnings growth rate in comparison with low or non-dividend-paying companies. Similarly, Kim and Seo (2010) highlighted the aggregate stock exchange's asymmetric behaviour of dividend smoothing. The empirical results pointed out that, there is an initial influence of permanent earnings over the adjustment process of aggregate stock market dividend. Additionally, it is stated that, a change of permanent earnings can be signalled by the dividend adjustment. Thus, according to empirical model the signal of dividend adjustment on earnings validate the traditional theory of dividend signalling. Subsequently, Leary and Michaely (2011) argued that, the firms that have low growth levels, fragile managerial control and larger holdings of institutions have preferred more smoothed dividends, in comparison with newly established small cap firms. It is also confirmed that, a large number of firms smoothed the dividend payment, since 1930. However, Brav et al. (2005) surveyed with 384 financial executive managers to shed light on the decision of dividend policy and found that, the relationship of dividends and earnings have reduced in comparison with 1950s, as also contrast to Lintner (1956)'s findings.

Brown et al. (2008) have examined the future predictability of earnings and corporate dividend policy decisions in 39 countries from 1995 to 2004. It is documented that, the firms that show high level of dividend smoothing indicates lower relation between forecast of earnings and dividends. Also, the forecasting error is lower in '*common low capital market-based countries and in countries with well-developed financial (debt and equity) markets*' where managers of the firms exhibit high incentives based upon dividend smoothing and signalling (Brown et al., 2008). Recently, Araujo et al. (2011) argued the mystery of dividend signalling hypothesis by claiming that, it is plausible to verify the prediction of signalling hypothesis. The empirical model established with utility function that incorporates with property of signal-crossing and the results showed that, the signalling is plausible; yet, dividends and earnings change, positively or negatively, are only related with the lack of signal-crossing property. Meanwhile, Bahng, Jeong and Lee (2011) investigate the G7 countries dividend adjustment behaviours by applying partial adjustment model. The study explored that, speed of adjustment and partial adjustment time is unsettled and nonlinear. Following that, Belghitar and Najjar (2012) pointed to the cash flow content in regard to dividend smoothing. The study based upon partial adjustment model over the cash flows. As a result of the empirical test, the companies have smoothed the cash flows, in UK. Therefore, it can be said that cash flow play vital role on the corporate dividend policy determinations. Additionally, the adjustment coefficients are found lower than original partial adjustment model. So that researchers claimed that, their model estimation is closer to practice in comparison with Lintner (1956) 's partial adjustment model. As recently, Bhatti et al. (2014) pointed out the signalling and smoothing dividends via Lintner (1956) partial adjustment model with structure of Tobit. The empirical models showed that, the results coincide with the hypothesis of signalling over the either original and adjusted partial adjustment model. To support that, Chen and Kao (2014) argued the effect of dividend change on future probability via generalised method of moments approach (GMM with the respect of panel data models. According to the empirical model, the rise dividends are greatly correlated with the future profitability. Conversely, the decline of dividends disposed to coinciding performance of profit. However, abnormal earnings are also play vital role to convey a large amount of information for future profitability.

Andreas et al.(2008) observed the UK, US and Germany with the partial adjustment model and found that in the Germany, dividend cut and omission seen more frequently than the UK and US between 1984 and 2005. As a result, it can be said that aggregate German stock index's dividend behaviour is less sticky or more volatile than the US and UK. Moreover, Chen et al. (2012) have widen the managerial dividend determinations by combining pre-war (1872-1945) and post-war (1946-2006) periods' return and dividend predictability in the case of price of asset variation. It is documented that, the dividends are sharply smoothed during the post-war period; meanwhile predictability of dividend growth lack cannot be taken as cash flow news did not affect variation of stock price. Yet, in accordance with Chen et al. (2012), it is more realistic to validate dividend smoothing.

The correlation of earnings, stock prices and dividends also matter for dividend literature. Lee (1996) argued the relation of stock prices, dividends and earnings in respect to logarithmic returns. The co-integration test results showed that, the permanent earnings affects the change of dividends. In detail, the stock price change is driven by both change of earnings and dividends. Thus, it can be validated that these coefficients are significantly correlated. Subsequently, Chen and Wu (1999) identified the correlation of earnings, stock prices and dividends to test the dividend smoothing and signalling hypotheses. The empirical results showed that, the stock prices, dividends and earnings are inter-correlated. To elaborate that, the change of dividends usually drives other components so that the results corresponded with dividend smoothing and signalling phenomenon. Notably, it is also identified that frequent change of dividend generates information of unexpectedly changed future earnings that crucially important for firm managers and investors. Notwithstanding, Gwilym et al. (2004) studied on the growth of real earnings and dividends, the dividend payouts and returns of the stocks. The empirical evidences showed that, the growth of real earnings and payout ratio are positively related. Yet, it is also found that, the payout ratio is negatively correlated with real returns in UK between 1900 and 2001 but, there is no evidence to demonstrate the autocorrelation between real dividend growth and payout ratio.

In addition, the Marsh and Merton (MM) model is one of the essential study in the dividend literature. The model applies the target dividend level as a tool of constant earnings, also, the model paid close attention on lagged stock prices, instead of the lagged earnings as Fama and Babiak (1968) applied in *the partial adjustment model*.

Marsh and Merton (1987) have quite different aspect on the dividends, also the empirical results presented that; dividend puzzle cannot be verified by dividend signalling. Additionally, other studies have invalidated the signalling theory, respectively, Gareth and Priestly (2000), DeAngelo, DeAngelo and Skinner (2004), Grullon, et al. (2005), Gwilym et al. (2006).

To elaborate invalidating signalling and smoothing hypothesis, Gareth and Priestly (2000) analysed the behaviour of dividends over the aggregate stock markets. The empirical results showed that, dividends are significantly smoothing with permanent earnings that unexpectedly changed during the specified time horizon but it is also specified that the permanent changes in earnings can be captured by lagged share prices, hence, there is no evidence as favour of dividend signalling among the permanent earnings. Subsequently, On the contrary to researchers that have tested the variety of dividend cases upon signalling and smoothing hypotheses, Frankfurter and Wood (2002) tested the consistence of the empirical models of the dividend policy. To elaborate that, the method, period of sample and frequency are tested to examine reliability of the models. Aftermath the careful considerations, it is stated that '*no dividend model, either separately or jointly with other models, is supported invariably*' (Frankfurter and Wood, 2002). In other words, it is found that dividend models are not conclusive and/or consistent. Following that, DeAngelo, DeAngelo and Skinner (2004) examined the dividend concentrations and found that dividend concentration has boosted in last twenty years. However the dividend payout ratio did not changed between 1978 and 2000, thus, the doubts have risen on dividend signalling hypothesis. In brief, the study disapproves the validity of dividend signalling hypothesis. Meanwhile, Bernhardt et al. (2004) have tested dividend signalling models with non-parametric techniques. The initial research showed that, there is a relation between earnings and dividends, yet the closer examination showed that the dividend does not differ on the long-run so it is determined that, the models of dividend signalling do not explain the corporate dividend policy. Then, Grullon, et al. (2005) applied the *non-linear model of earnings* expectation that measures the correlation between changes in dividends and future earnings. According to that model, dividend change is not correlated with the change of future earnings. Shortly, the relationship between the change of dividends and future earnings are rejected by applying *the non-linear models of earnings expectation*. In contrast, Nissim and Ziv (2001) found that change of

dividends have positively related with expected earnings in the future. However, Basse et al. (2014) argued that, previously dividends were important but nowadays there is no need to be afraid of dividend seizures or omissions, in regard to banking sector. The industry of European banking documented and claimed that dividend signalling and smoothing are irrelevant phenomenon.

However, there are other studies about the different coefficients that related with dividend payout ratio. Firstly, Fama and French (2001) argued that dividend payment correlated with investment level and it is observed that, firms that invest heavily pay fewer dividends than those who have lower levels of investment. Secondly, Jensen et al. (2010) asserted that, the dividend decline corresponds with the reduction of the companies' real options value. Thirdly, Abreu and Gulamhussen (2013) examined the dividend payout of the bank holding companies in the US with respect to prior and core crisis period of sub-prime mortgage crisis in 2007-2009. So, it is argued that the regulatory power was not effective to constraint the payouts of dividend over the banks that undercapitalised at the prior period of financial crisis. Hence, it is pointed out that regulatory power also crucially important in case of dividend payout policy.

As a result, there are fewer studies which examined the recent years dividend smoothing and speed of adjustment and also a large number researchers have investigated the UK and US so that, the gap will be filled with this research that based on SBF120 and DAX30 indices.

2.2. Data and Methodology

In this study, the annual data of the companies' earnings per share (EPS), dividend per share (DPS) and stock prices are considered with the individual market capitalization figures. These are the constituent companies that have investigated in the SBF120 index of France DAX30 index of Germany. The data set conducted with 150 companies with the purpose of investigating the dividend behaviours on the listed companies of France and Germany, which is collected from Thomson Reuters Datastream.

The payout ratio denotes the percentage of earnings being paid as dividend to shareholders. In other words, it shows the proportion of dividend payment and company earnings.

In this study, the payout ratios are both obtained from the data stream and calculated with the traditional dividend payout ratio formula. The payout ratio that collected from datastream is compared with the one calculated by using traditional payout ratio. It is observed that, the datastream figures differ from the results from traditional payout ratio formula. Thus, it has determined to apply fundamentally approved traditional dividend payout ratio formula, as below.

$$Payout\ Ratio = \frac{DPS_{t_0}}{EPS_{t_0}} \times 100$$

The DPS_{t_0} shows dividends per share of the firm, at the time t_0 . Meanwhile EPS_{t_0} denotes earnings per unit of the firm, at the time t_0 as a recent time period. Additionally, the equation renders the result as percentage by multiplying with the 100.

Then, the stock returns are also calculated with the logarithmic return phenomenon to determine the pre-crisis, core crisis and post-crisis periods. Additionally logarithmic return is commonly known as continuously compounded return. The formula can be seen as below.

$$L_{r_t} = \ln(P_t) - \ln(P_{t-1})$$

The L_{r_t} symbolise the continuously compounded return at time t_0 . Following that, $\ln(P_t)$ indicates the stock price of firm at the time period t and $\ln(P_{t-1})$ denotes the prior stock price of the firm. Furthermore, the formula can also be rearranged as it demonstrated below.

$$L_{r_t} = \ln\left(\frac{P_t}{P_{t-1}}\right)$$

The research is established upon the sectorial analysis. Therefore, it is essential to calculate sectorial figures. Firstly, the data set of DPS and EPS of the firms has been matched with super sectors that categorised by industrial classification benchmark sector (ICBS), which is received from the datastream. After match the firms with relevant super sectors, the sectorial figures are calculated by the arithmetic average of relative firms. The average aggregate market trends are equally important and it has

produced with the arithmetic average of the all sectors. The arithmetic mean calculated with the formula as below.

$$\bar{X} = \frac{\sum_{i=1}^n x_i}{n}$$

Coefficients are denoted as x_i ($x_1, x_2, x_3, \dots, x_n$) and its arithmetic mean is symbolised as \bar{X} , also n shows the number of observations. Similarly, the arithmetic mean can also be simplified as it shown below.

$$\bar{X} = \frac{x_1 + x_2 + x_3 + \dots + x_n}{n}$$

Lintner (1956) interviewed the 28 managers of chosen US firms to explore the rationality of the dividend behaviours. Lintner (1956) characterised the corporate dividend decisions as a partial adjustment model. Additionally, the partial adjustment model developed based upon the data base that built on the result of the interviews.

The econometrically testable equation could derive from fundamental equation as below.

$$D_{i,t}^* = r_i \times E_{i,t} \dots\dots\dots (1)$$

The equation figures can be interpreted as follows: for any time period t , the D_{it}^* indicates the target dividend level or desired dividend payment for i , r_i is desired or aimed payout ratio and $E_{i,t}$ is firms current earnings. In respect to any given time period, the company will partly adjust the target level of dividend. Thus, the equation (1) can be adjusted as,

$$D_{it} - D_{i,(t-1)} = \alpha_i + C_i(D_{i,t}^* - D_{i,(t-1)}) + u_t \dots\dots\dots(2)$$

the dependent coefficient is denoted as $D_{it} - D_{i,(t-1)}$ that exhibits the change actual dividend payment, the α_i appears as a constant term, $D_{i,t}^* - D_{i,(t-1)}$ is the difference between desired dividend and prior dividend payment, which shows the change of firm's desired dividend payment and C_i is coefficient of the regression that shows the speed of adjustment. To elaborate the coefficient, it defines the influence of the desired dividend change how rapidly affects the actual dividend change. The equation can be written as it shown below, in regard to equation (1).

$$D_{it} - D_{i,(t-1)} = \alpha_i + C_i((r_i \times E_{i,t}) - D_{i,(t-1)}) + u_t \dots\dots\dots(3)$$

Generally, the positive constant term (α_i) denotes the manager's greater resistance of the dividend cut and/or omission (Andres et al., 2009). Furthermore, if constant term equal zero and speed of adjustment coefficient equal 1, the actual dividend change ($D_{it} - D_{i,(t-1)}$) will be corresponded to the change of desired dividend payment ($D_{i,t}^* - D_{i,(t-1)}$). On the contrary, if C_i equal zero, the change of desired dividend change will not affect the actual dividend change. Also, under the hypothesis of constantly adjusted dividend influence on earnings change that signify the speed of adjustment coefficient within $0 \leq C_i \leq 1$. Also u_t implies the discrepancy of dependent coefficient and independent coefficient. Hence, in this case, it represents the conflict between model's desired and actual dividend change coefficients and the change of desired and actual dividend in practice.

Further, according to equation (3), when desired dividends ($(r_i \times E_{i,t}) - D_{i,(t-1)}$) are changed as one unit/percentage, it adjusts the actual dividends $D_{it} - D_{i,(t-1)}$ as an amount/percentage of adjustment speed (C_i).

It is commonly believed that, the lower level of speed of adjustment coefficient can only be chosen by the firms that would like to reduce dividend fluctuation. However, the firms that are not pay close attention on stability of dividends allow dividend decrease with the earnings. The speed of adjustment will be measured according to prior studies average speed of adjustments that reported as in table 2, in regard to 9 researches from 1956 to 2006.

Table 2: Prior Study Results of Estimated Payout ratios and Speed of Adjustments.

Study	Sample	Period	Speed of adjustment	Target payout ratio	
				Estimated	Arithmetic average
Behm and Zimmermann (1993)	32 major quoted German firms	1962-88	0.26; 0.13 ^a	0.48	0.58
Lintner (1956)	All American corporations	1918-41 ^b	0.30	0.50	
Mueller (1967)	67 US firms	1957-60 ^c	0.16; 0.27	0.26; 0.39	
Fama and Blahak (1968)	392 major industrial US firms	1946-64	0.32-0.37	0.40 ^a -0.82	
McDonald et al. (1975)	75 French firms randomly selected from 400 largest firms in 9 industries	1962-68	0.12-0.33	0.41-1.01	
Aivazian et al. (2006)	All US firms in Compustat database	1981-99	0.24	0.50	0.26
Short et al. (2002)	211 UK firms	1988-92	0.38	0.16 ^d ; 0.19 ^e - ^x 0.17 ^f	0.26
Khan (2006)	350 large UK firms	1985-97	0.20-0.45	0.33-0.83	0.38-0.46
Benzinho (2004)	All 34 firms listed on Euronext Lisbon	1990-2002	0.35	0.22	0.42

(Source: Andres et al., 2009)

Lintner (1956) was not contented with just defining speed of adjustment coefficient. Thus, the model is furthered as multiple regression equation. The process of the adjustment can also be reported as equation (4).

$$D_{i,t} = \alpha_i + C_i \times D_i^* + (1 - C_i) \times D_{i(t-1)} + u_t \dots \dots \dots (4)$$

Following that, when equation (4) is rearranged, the new equation can be provided as equation (5).

$$D_{i,t} = \alpha_i + C_i \times r_i \times E_{i,t} + (1 - C_i) \times D_{i(t-1)} + u_t$$

As a result of equation (5), the econometrical model can be finalised as below.

$$D_{i,t} = \alpha_i + b_i \times E_{i,t} + (1 - C_i) \times D_{i(t-1)} + u_t \dots \dots \dots (5)$$

The first independent coefficient is b_i and where b_i is a regression coefficient of target payout ratio that equal multiply of the dividend adjustment speed and target payout ratio. The second independent coefficient is $1 - C_i$, which is regression coefficient of prior period. Also it is known as a coefficient of the lagged dividends.

3.1. Chapter II: Analysis of Case Studies

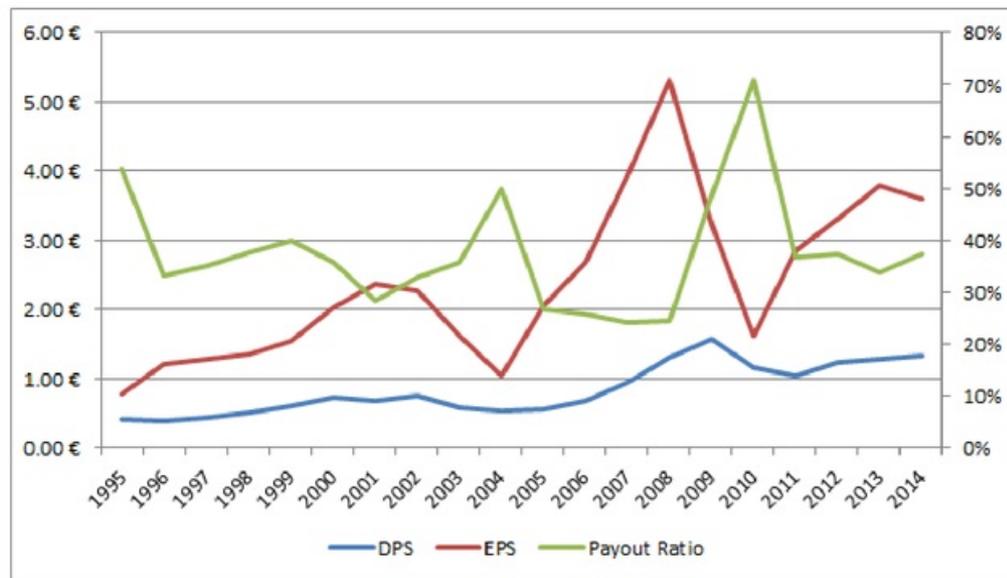
3.1.1. Analysis of Germany – DAX30

Germany has one of the most important stock market index, which is listed as DAX30 in Europe. There are 30 large-cap stocks from 17 super sectors, in the DAX30.

Figure 2 demonstrates the historical average of EPS, DPS and payout ratio from 1995 to 2014. The major axis (left side) is for DPS and EPS observation while the mirror axis (right side) is for the plot of payout ratio. During the 1995-2014 the stock markets experienced two crises, such as dot.com crisis (1999-2001) and the US based sub-prime mortgage crisis (2007 and 2009). It is observed that, the EPS significantly rose between 2004 and 2008. When payout ratio is closely investigated, it is found that payout ratio has been negatively related with EPS, such as, 2002 and 2005, 2009 and 2011 can be taken as major significant samples. Furthermore, the case of 2002 and 2005 differ from 2009 and 2011. The first case shows that, EPS decreased more sharply, in comparison

with DPS⁴. As a result of that, payout ratio appeared on the significantly increased trend until EPS began to upward trend. The case is slightly different, because, EPS plummeted in 2008, regardless of increasing DPS trend until 2009. Therefore, payout ratio rose significantly, as a result of higher DPS and lower EPS. Following that, with beginning of EPS upward trend, payout ratio decreased from 71% to 37%.

Figure 2: DAX30, historical average trend of DPS, EPS and Payout Ratio



The average dividend payment of the German stock market (DAX30) has risen from €0.41 to €1.34, since 1995. However, it has risen more significantly between 2004 and 2009. When DPS and EPS are compared, it appears that, companies have increased the dividend payment, instead of cut or omission, in 2009. This detail shows that, companies have paid higher dividends to motivate shareholders, in regardless of severe financial crisis conditions.

To observe the dividend adjustment, the study conducted the regression analysis based on the empirical model that reported as equation (3) with three different target payout ratios at 25%, 50% and 75%. According to the 25% target payout ratio

⁴ EPS and DPS decrease reported as, respectively, 32.18% and %16.51, in respect to annual compound growth rate formula.

assumption, at the 5% significance level, the regression coefficient found statistically significant; in other words different than zero, with regard to lower F and P values⁵. As a result, based on DAX30 companies, the speed of adjustment coefficient is found to be 0.4005. The speed of adjustment coefficient of DAX30 is found to be higher than the results from prior that have showed in table 2. The higher speed of adjustment also demonstrates frequent fluctuation on dividend payment that has occurred during the 1993-2003, 2007-2012. Furthermore, the intercept and/or constant term appear as 0.1253. Since constant term appears as positive, the managers are reluctant to cut dividends as Lintner(1956) pointed out in the fundamental partial adjustment analysis. Also, according to the R^2 value, independent coefficients explanatory power is 57.13%. In other words, the desired change of dividend explains 57.13% of the actual dividend change.

Table 3: DAX30 Regression Analysis, under the 25% of Payout Ratio Assumption

<i>Regression Statistics</i>					
Multiple R		0.755840351			
R Square		0.571294636			
Adjusted R Square		0.546076674			
Standard Error		0.117279456			
Observations		19			

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.311597553	0.3116	22.6543	0.000181721
Residual	17	0.233826004	0.01375		
Total	18	0.545423557			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	0.125346235	0.031351121	3.99814	0.00093
C	0.400538461	0.084152912	4.75965	0.00018

⁵ The model's F and P value is lower than 5%, therefore model is reliable.

According to 50% target payout ratio, the speed of dividend adjustment level is found as 0.29⁶. However, since P and F values of the model higher than 5% significance level, the model coefficients are not different than zero because of that, the coefficients are not statistically significant. Yet, hypothetically, if the model coefficients are postulated as statistically significant under the 50% of target payout ratio assumption, the speed of adjustment coefficient found to be similar to findings of Behm and Zimmermann (1993) study that tested on 32 large-cap German firms.

Table 4: DAX30 Regression Analysis, under the 75% of Payout Ratio Assumption

<i>Regression Statistics</i>	
Multiple R	0.7892
R Square	0.6229
Adjusted R Square	0.6007
Standard Error	0.1100
Observations	19

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.33973	0.33973	28.07727	0.0000589
Residual	17	0.20570	0.01210		
Total	18	0.54542			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	-0.1427	0.0441	-3.2374	0.0048418
X3	0.1825	0.0345	5.2988	0.0000589

The table 4 summarise the regression results that shows regression model is statistically significant with 75% target payout ratio assumption. The independent coefficient of the model explains 62.30% of the dependent coefficient that stated as actual dividend change. The speed of adjustment coefficient reported as 0.1825 that denotes the managerial reaction speed on the actual dividend change in regard to variety of circumstances. Yet, the adjustment coefficient slows down when target payout ratio increased. Additionally, the result is consistent with Behm and Zimmerman (1993)'s speed of adjustment coefficient that reported with in 0.13 and 0.26.

⁶ See table 5 in appendix.

To sum up, aggregate stock market has, on average, paid €0.84 as dividend per share and received €2.39 as earnings per unit along with a payout ratio that found as approximately 35%. Furthermore, the statistically significant regression analysis results of the speed of adjustment found as 0.4005 and 0.1825, for the 25% and 75% target payout ratio assumption as respectively. So that, desired dividend change adjusts 40.05% and 18.25 of actual dividend change under the 25% and 75% target payout ratio assumption. Hence, it can be stated that managers are less willing to adjust dividends with higher target payout ratio. Moreover, the partial adjustment model is not significant under the 50% of target payout ratio assumption. Yet, if the model is hypothetically considered as significant, it can be said that, the higher the target payout ratio the lower the adjustment speed.

In the following sections, the study has examined the sectorial dividend behaviours and dividend adjustments of four sectors

3.1.2. Automobile & Parts Sector

There are four companies in automobile & parts sector and it produces 24.07% of market capitalization of the stock market. The automobile & parts sector has, on average, paid €0.98 per share and average dividend payment of the stock market is found to be as €0.83 per share.

The figure 3 illustrates the fluctuations of the sector's dividend payment per share, in comparison with market average. Firstly, dividend payment sharply rose from 1999 to 2002, which was during the dot.com crisis. The compound annual growth rate of the sector's dividend payment per unit calculated as 50.30%⁷ during the dot.com crisis. In contrast, the market average DPS trend had slightly increased from €0.62 to €0.75, with compound annual growth rate of 6.64%. Subsequently, dividend movements illustrated a downward trend but it lasted only for one year. The average DPS of both market and automobile & parts sector significantly rose from 2007 to 2009. However, after the 2009, DPS trend largely declined, in comparison with market. Then, a sharp drop of the sectorial DPS was faster than the average market DPS.

⁷ It is calculated with compound annual growth rate formula.

Figure 3: The Automobile & Parts Sector's DPS versus Average Market DPS

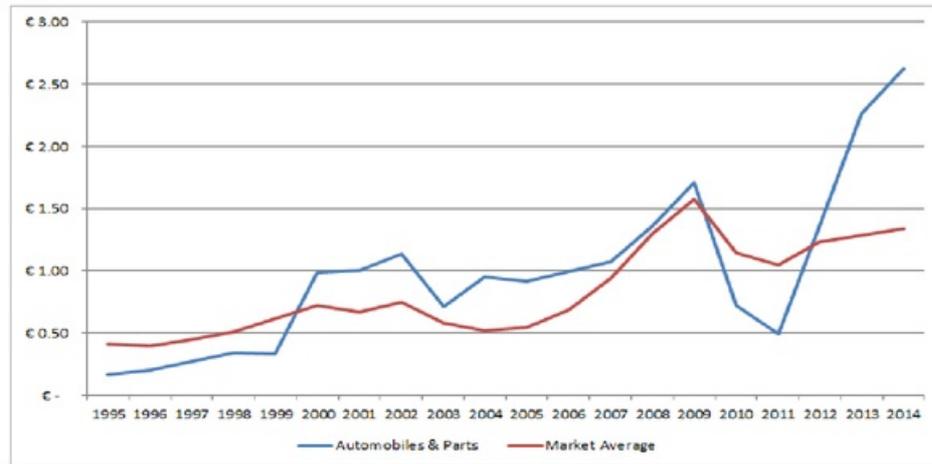


Figure 4 exhibits the sectorial EPS and average market EPS. The sectorial EPS has fluctuated between 2002 and 2006, while average market trend constantly increasing. The automobile and parts sector's EPS increased more sharply, up until 2008. Therefore, it can be said that, the effect of crisis delayed one year in German stock exchange (DAX30). The average market trend also appears with same trend. However, after the 2008, while markets plummeting, the sector's slightly decreased until 2009. Subsequently, 82.20% of sectorial earnings disappeared (respectively, from 6.01 to 1.06). In contrast, after 2010, the average EPS of the automobile & parts sector visual rising from €1.06 in 2009 and €17.66 in 2013, which is highlight the record level since 1995.

Figure 4: The Automobile & Parts Sector's EPS versus Average Market EPS

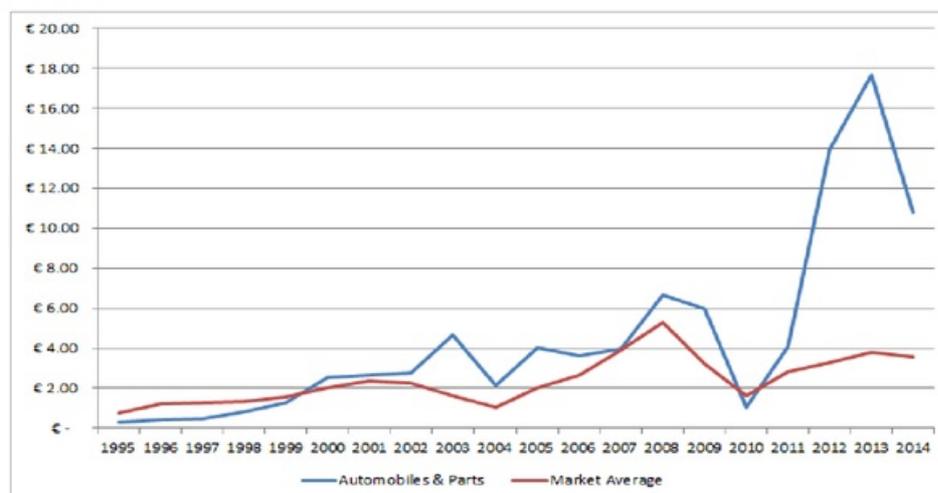
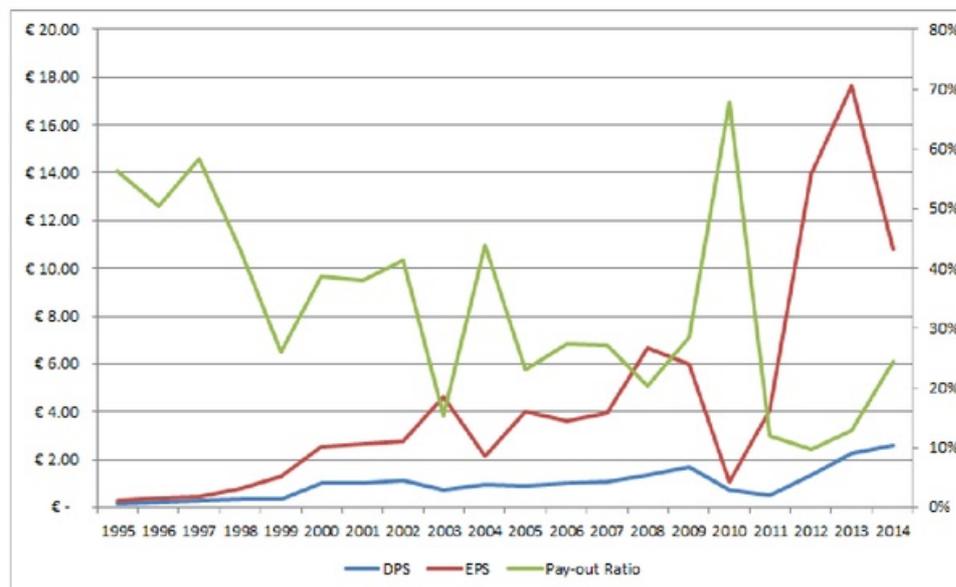


Figure 5 illustrates, the major axis (left side) is for DPS and EPS observation while the mirror axis (right side) is for the plot of payout ratio. It can be seen that, the payout ratio has an opposite trend with the EPS trend, also, trends that could be observed in 2003-2005 and 2009-2011. After the 2009, the EPS sharply decreased as a reaction to dividend decline. Meanwhile, the excessively high payout ratio appeared in the graph but it did not maintain the EPS because EPS decline is observed as more significant than DPS. Thus the payout ratio artificially increased between these years. Furthermore the reverse trend can be seen after the 2010, as result of same logic. Also, there is a slight detail that, after the 2008 the sectorial EPS only slightly declined in 2009 because of the companies' high dividend payment as initiative, but, when companies seized the dividends the sectorial EPS plummeted. Moreover, the artificial payout ratio rise and fall ended in 2011, and then the increase of dividends significantly boosted EPS, from 4.05 to 17.66, which is more than four times. Yet, dividend increased slowed down after 2013 and it reflected as decline on EPS trend line.

Figure 5: Historical DPS, EPS and Payout Ratio between 1995 and 2014.



The regression analysis of the Automobile & Parts sector has run with three different target payout ratio assumptions. These models significance test results are different from regression analysis results of aggregate stock market. To elaborate that, the model coefficients has been found meaningful⁸ under the assumption of 50% and 75% target payout ratio levels, instead of 25% that has been found meaningful on aggregate stock market's regression analysis. Additionally, the speed of adjustment coefficient is found to be 0.33 that under the 25% target payout ratio and that is consistent aggregate market's regression result, which based upon at 25% payout ratio target but the sector's adjustment coefficient is statistically insignificant⁹.

In regard to 50% and 75% of target payout ratio, the speed of adjustment coefficient found to be 0.1481 and 0.0930 as respectively and these results show that the Automobile & Parts sector dividend adjustment is quite slow in comparison with aggregate stock market and prior research results that has been shown on the table 2. Under the 50% target payout ratio assumption, according the coefficient of

⁸ The models F and P values are lower than 5% significance level, so that, coefficients are different than zero.

⁹ The models F and P values are higher than 5% significance level, so that, coefficients are not different than zero, see table 6 in appendix.

determination (R^2) the independent coefficient of the model explains 55.20% of dependent coefficient. Meanwhile, 51.18% of dependent coefficient is explained by the independent coefficient with regard to regression model that conducted with 75% target pay-out ratio.

Table 7: Regression Analysis of Automobile & Parts Sector, under the 50% Target Payout Ratio Assumption

<i>Regression Statistics</i>					
Multiple R		0.742995332			
R Square		0.552042064			
Adjusted R Square		0.525691597			
Standard Error		0.296398608			
Observations		19			

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	1.840501501	1.840501501	20.94999177	0.000267808
Residual	17	1.493486292	0.087852135		
Total	18	3.333987792			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	0.086833757	0.082835313	1.048269803	0.30918992
C	0.148103549	0.032357394	4.577116097	0.000267808

Table 8: Regression Analysis of Automobile & Parts Sector, under the 75% Target Payout Ratio Assumption

<i>Regression Statistics</i>					
Multiple R		0.7153716			
R Square		0.5117565			
Adjusted R Square		0.4830363			
Standard Error		0.3094395			
Observations		19			

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	1.706189963	1.70619	17.8187	0.000574701
Residual	17	1.627797829	0.09575		
Total	18	3.333987792			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	-0.1159172	0.091788212	-1.2629	0.22368
C	0.0930129	0.022034609	4.22122	0.00057

To sum up, the automobile & parts sector has, on average, paid higher dividends and it corresponded as higher earnings, in comparison with the aggregate market average between 1995 and 2014. Notably, the sectorial average of dividend is higher than market average, regardless of the severe financial crisis factors in 2007-2009. According to regression analyses, the speed of dividend adjustment is statistically significant, under the 50% and 75% target payout ratio assumptions. Additionally, the result of these regression model showed that, the dividend adjustment levels are quite slow in comparison with prior research results¹⁰. The lower dividend adjustment speed with sharp EPS decrease led to artificially high payout ratio, in 2010. Therefore, artificially high payout ratios were not maintained the EPS.

3.1.2. General Industrials Sector

To begin with, there are two major companies that produce the figures of sectorial average. Surprisingly, companies have different characteristics; therefore, the company based comparison analysis will be demonstrated, instead of aggregate sector overview, as an exception. Since only two companies in this sector, the analysis of these companies also reflects the general overview of sector.

Siemens is one of the largest company in general industrial sectors and it produces the 7.23% of the top German stock exchange (DAX30). However, ThyssenKrupp AG is an internationally important company and it produces the 0.83% of market-cap in DAX30 index. Furthermore, Siemens AG's average DPS and EPS found as respectively, €1.32 and €3.21 between 1995 and 2014. Meanwhile, ThyssenKrupp AG's average DPS and EPS reported as, respectively, €0.63 and 1.15¹¹.

The figure 6 illustrates the fluctuation of companies' DPS from 1995 to 2014. DPS of two companies has had similarly upward trend line between 2004 and 2010. However, ThyssenKrupp's compound annual growth rate as found to be twice as the Siemens AG's growth rate¹². Regardless of higher dividend growth rate of the ThyssenKrupp, the Siemens AG still pay higher dividend than ThyssenKrupp¹³. It is clear that, both companies chose stable dividend payment policy during the crises

¹⁰ See table 2.

¹¹ Complete figures can be seen in the table 9 and 10 in appendix.

¹² ThyssenKrupp and Siemens' compound growth rates calculated as, respectively, 17.26% and 6.37%.

¹³ ThyssenKrupp and Siemens' average dividend payment calculated as, respectively, €0.96 and €1.38

periods, dot.com crisis (1999-2001) and sub-prime mortgage crisis (2007-2009). Thus these horizons could be considered as a supportive argument to stable dividend payment policy. In figures, during the dot.com crisis, the Siemens AG fixed the dividends to €0.50 from 1998 to 2000 and triggered the upward trend in 2001; meanwhile the ThyssenKrupp AG also stabled the dividends as €0.72 between 1999 and 2002. When these figures compared Siemens AG fixed the dividends a year earlier than ThyssenKrupp AG but the dividend level of ThyssenKrupp AG is higher than Siemens AG. The recent crisis figures showed that, the dividend payment stabilisation policy began and finished at the identical time. Following the recent crisis horizon, the trends showed inverse directions; while, Siemens AG increasing the dividend payment aggressively, ThyssenKrupp AG sharply declined the dividends.

Figure 6: Siemens AG versus ThyssenKrupp AG among the DPS

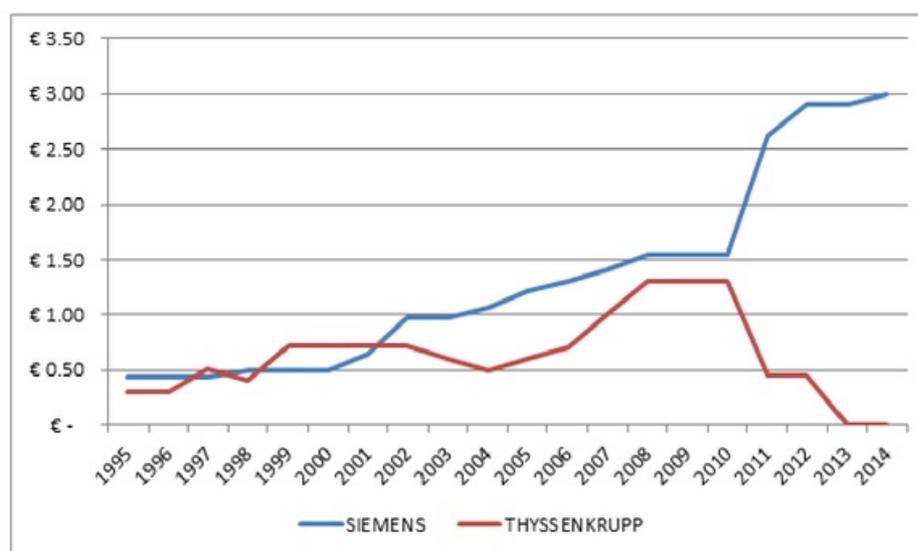
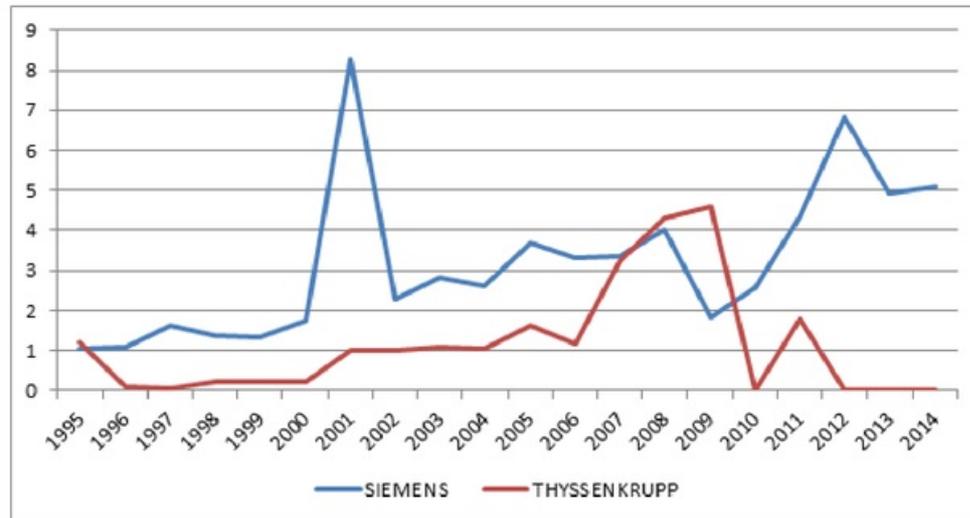


Figure 7 exhibits the general overview of these two companies' EPS trends. In 2000, when Siemens maintain the DPS, it positively affected the EPS, which is increased from €1.75 to €8.29 within a year. Meanwhile, the ThyssenKrupp's EPS is also increased from €0.23 to €1.02. Subsequently, ThyssenKrupp's earnings are levelled out, while Siemen's earnings are decreasing sharply. In brief, it can be concluded that the higher DPS growth rate reflected as higher EPS with regard to findings of figure 6.

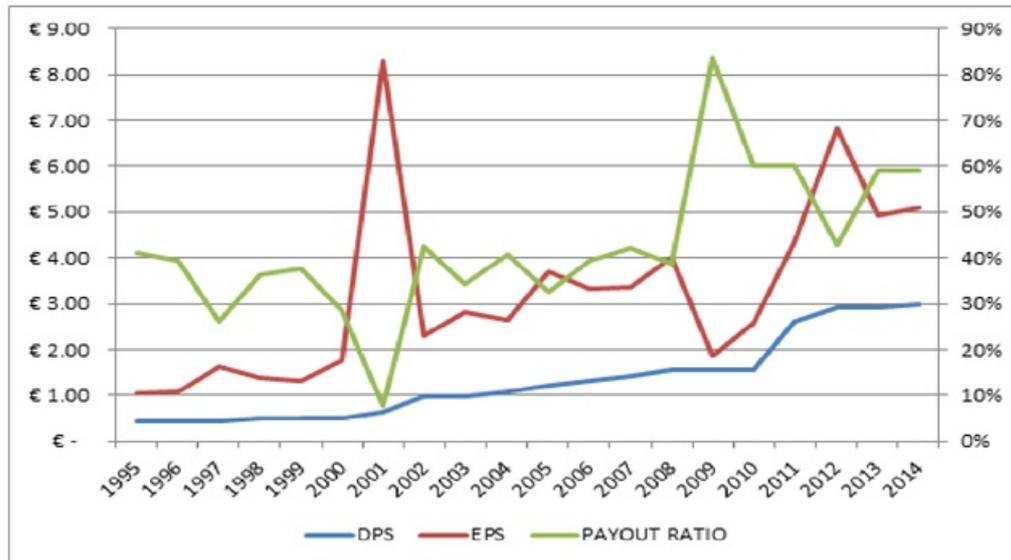
Figure 7: Siemens AG versus ThyssenKrupp AG among the EPS



Individually, figure 8 shows the DPS and EPS behaviour of the Siemens. The major axis (left side) is for DPS and EPS observation while the mirror axis (right side) is for the plot of payout ratio. It is observed that, payout ratio and EPS are negatively related. There are three sample periods¹⁴ that can be considered as an example of that relationship. It is clear that, if EPS decrease of faster than DPS, the payout ratio increases artificially, such as 83.78% in 2009. Therefore, dividend movements play vital role in case of payout ratio adjustments. Additionally, the stabilised dividend payment increased the confidence and EPS began to rise, in 2010. Subsequently, the dividends significantly increased from €1.55 to €2.93, until 2012 and it reflect as significantly sharp escalation on the EPS from 2.57 to 6.82. Following that, the slow increment of the dividend lead to the downward trend on the EPS, this can be observed in 2012 and 2013.

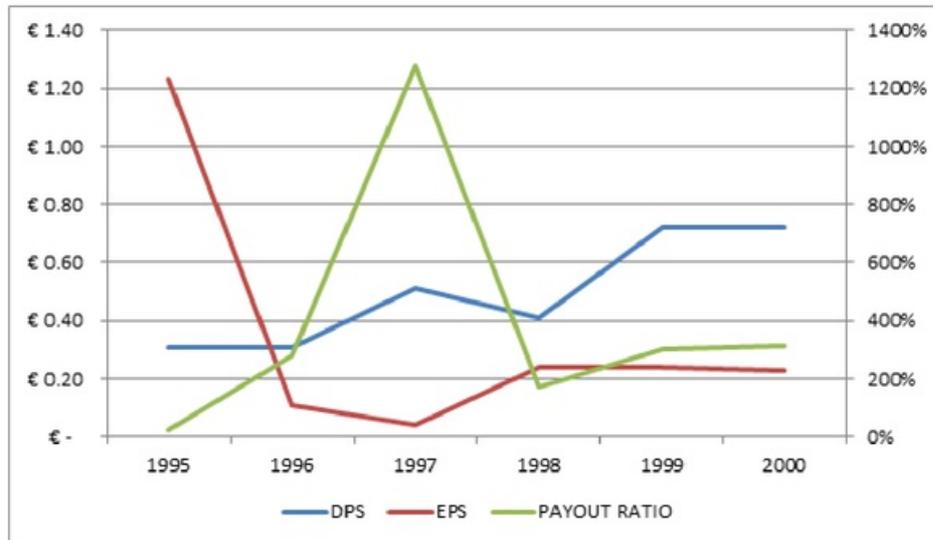
¹⁴ Sample periods identified as 2001-2002, 2008-2012 and 2012-2013.

Figure 8: DPS, EPS and Payout Overview of Siemens AG



Particularly the ThyssenKrupp AG's DPS, EPS and payout ratios are exhibited to highlight extremely high payout ratio period, from 1995 to 2000, on the figure 9. The major axis (left side) is for DPS and EPS observation while the mirror axis (right side) is for the plot of payout ratio. The payout ratio figures are extremely high, because of the excessive amount of dividend payment between 1995 and 2001, as it can be seen figure 9. Therefore, the excessively high payout ratio suppresses the other trends after 2000. Because of that, graphs are divided into two parts. It is clear that, the first peak of payout ratio is excessively high because of the severe EPS fall while dividends were constant. Subsequently, the general trend of DPS rose from 1997 to 1999. Thus, the payout ratio is boosted and the payout ratio that boosted by the high dividend lead to increment of EPS from €0.04 and €0.23 within identical horizon.

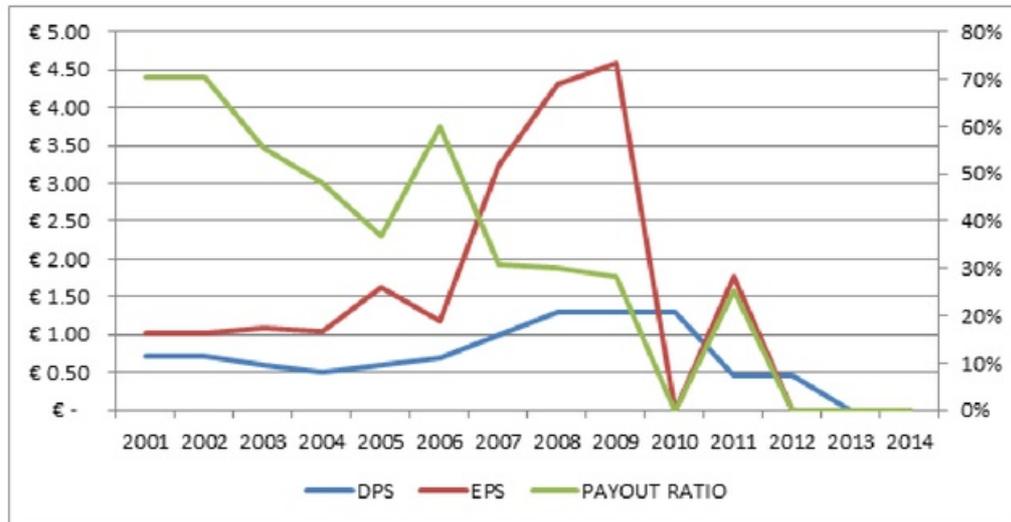
Figure 9: ThyssenKrupp AG's DPS, EPS and payout overview between 1995 and 2000



The payout ratio trend, generally, appeared as a downward trend on the second part that presented in figure 10. It can be seen that, dividends have smoothed until 2008. The occurrence of bubble began with increase on the dividend trend, which drive the payout ratio at higher rates. Following that EPS increased faster than DPS, therefore, payout ratio decreased from 59.83% to 30.86%, just before the crisis. As mentioned before, the dividends are stabled during the crisis and the stable dividend payment increased the confidence of the company in the market. As a result, the inevitable downward trend is delayed, in comparison with the market average of EPS. After the 2010, despite of almost zero earnings per share, the company kept pay dividends. Yet the general downward trend of DPS drive the EPS up until zero¹⁵.

¹⁵ See Table 10 and 11 in appendix.

Figure 10: ThyssenKrupp's DPS, EPS and payout overview between 2001 and 2014



The companies' individual average of DPS, EPS and payout ratio are considered as sectorial figure for general industrials. After that, the sectorial figures are examined by using *partial adjustment model* with regard to equation (3). The regression analysis results showed that, only the model that conducted with 50% payout ratio assumption is found statistically significant. The regression model that conducted with 25% and 75% target payout ratio P and F values are found slightly higher than 5% significance level. Therefore, these two regression models coefficients are statistically insignificant¹⁶.

¹⁶ See table 13 and 14 in appendix.

Table 12: Regression Analysis of General Industrials Sector, under the 50% of Target Payout Ratio Assumption

<i>Regression Statistics</i>					
Multiple R					0.4892
R Square					0.2393
Adjusted R Square					0.1946
Standard Error					0.0947
Observations					19

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.0480	0.04796698	5.34791936	0.0335
Residual	17	0.1525	0.00896928		
Total	18	0.2004			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	0.0429	0.0229	1.8775	0.0777
C	0.0985	0.0426	2.3126	0.0335

According to table 12, the regression model coefficients is statistically significant at 5% significance level ($F(0.0335) < 0.05$) and the desired dividend change ($D_{it}^* - D_{i,t-1}$) explains 23.93% of actual dividend change ($D_i - D_{i,t-1}$). Also, the speed of adjustment factor reported as 0.0985. It can be concluded as 1% increase in desired dividend change lead to 9.85% adjustment on actual dividend change as an increment. Notably, the adjustment speed is lower than automobile & parts sector (14.81%). Additionally, when statistically insignificant models are postulated as significant, it is clear that the higher dividend payout ratio target leads to the lower speed of adjustment coefficient¹⁷.

To sum up, the speed of adjustment is quite low (0.0985), in comparison with the prior research results in the literature¹⁸. The results of the regression analysis can be interpreted as companies desired to reduce dividend fluctuations by lowering the adjustment speed instead of rapid dividend adjustments that cause more volatile dividend trends. Also, in accordance with the graphs, when dot.com and sub-prime mortgage crises are taken into account, it is observed that both of the companies stabilise the dividend payment as estimated by the regression analysis results. In another

¹⁷ The speed of adjustment coefficient of the regression model that conducted with 75% target payout ratio is reported as 0.0621 that is lower than speed of adjustment coefficient of the model that conducted with 50% payout ratio target.

¹⁸ See table 2.

words, managers are avoided to frequent dividend adjustments, also the positive intercept (0.0429) signals that managers resist to reduce dividends either.

3.1.3. Software& Computer Services

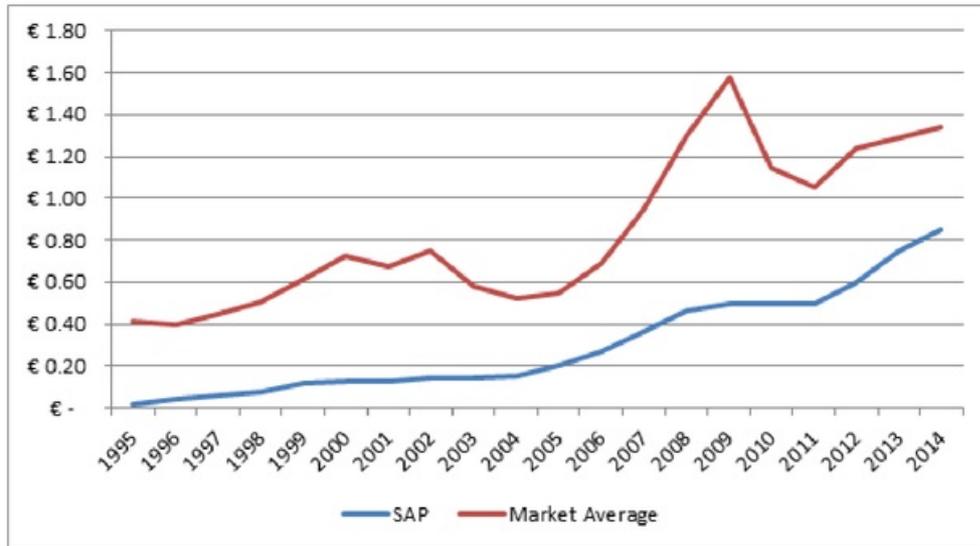
There is only one company, which is SAP SE¹⁹, in this sector. SAP SE is one of the leading company as large-cap in DAX30 index and it produces 7.16% of aggregate market capitalization. Therefore, the behaviour of DPS, EPS and payout ratio of SAP will be investigated in this part as software & computer services sector.

The average dividend payment of SAP is found as €0.30, which is quite low in comparison with the market average that reported as €0.83. Furthermore, when dividend per shares of market and company averages are compared, it is clear that, the market average is as twice as the company.

The figure 11 shows the detailed overview of DPS behaviours among the SAP and market average trends. Despite of the lower dividend payment, the company has smoothed the dividend payments from 2004 to 2009. Subsequently, the dividend payments are levelled out, as it occurred on ThyssenKrupp and Siemens AG. Then, the upward trend momentum has lasted in present time. Noticeably, the upward trend of average market trend more significant than the DPS of SAP between 2004 and 2009, but, the aggressive increase resulted as sharp decrease after 2009 in the market average trend. In short, the company preferred more stabilised dividend payment instead of sharp fluctuations as experienced by average market trend.

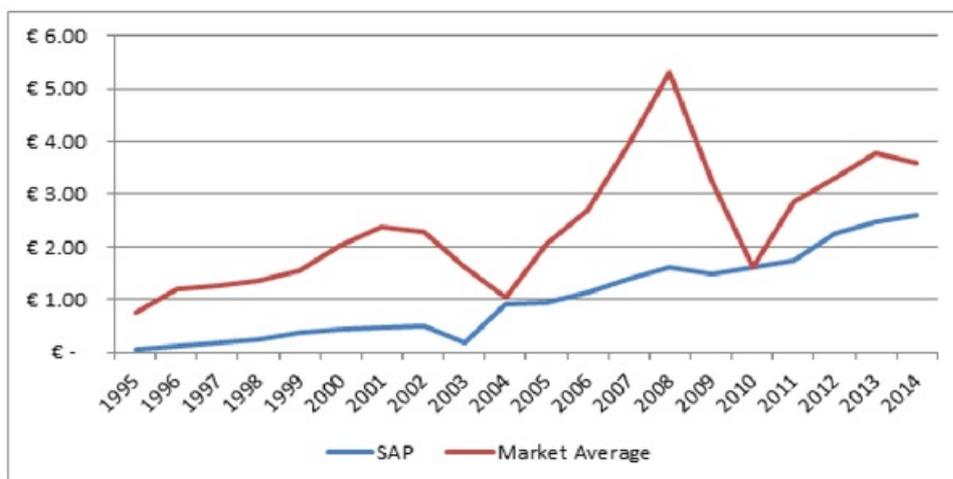
¹⁹It is a multinational company that is located 130 countries and produces enterprise software and software-related services.

Figure 11: SAP SE versus Average Market Trend among the DPS



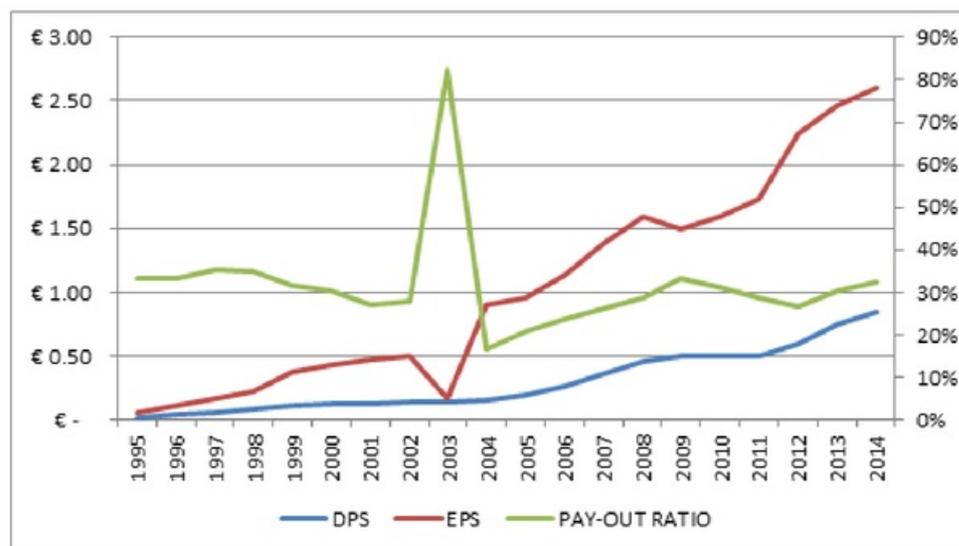
Next, the figure 12 illustrates the EPS behaviour of the SAP against the market average. The companies EPS has smoothed after the 2004 as similar to DPS. Meanwhile, the market average of the EPS is sharply escalated from 2004 to 2008. Following that period, the market average trend experienced the significant decline of the EPS until 2010, from €5.31 to €1.62. In brief, the significant upward trend of market average of EPS trend can be considered as an occurrence of the bubble and then the bubble bursts in 2009. Hence the EPS trend of market average declined aggressively while SAP experience the, almost, stable dividends and earnings.

Figure 12: SAP SE versus Average Market Trend among the EPS



The figure 13 shows the complete frame of the company's DPS, EPS and payout ratio behaviours. The artificially increased and decreased payout ratio can be seen between 2002 and 2004. In 2002, EPS fell significantly while, DPS was constant. As result of that, the payout ratio had risen artificially as explained earlier. Also, the increase of EPS reflected as inverse movement on the payout ratio. After that, the growth level of DPS boosted the payout ratio and it maintained the EPS as a significant upward trend. During the crisis horizon, company did not reduce the dividends, thus, it can be said that company maintained the shareholders confidence by avoiding the reduction of dividends. As a result, not to lowering dividend payment policies resulted as an upward trend upon the earnings. However, only slight decrease can still be seen as the turmoil effect of crisis in 2008 and 2009.

Figure 13: Overview of the SAP upon the DPS, EPS and payout ratio



The partial adjustment model has applied under the set of target payout ratios²⁰ and the analysis results showed that the model coefficient is statistically significant only under the 75% target payout ratio assumption with regard to 5% significance level. Also, when model individually conducted with 25% and 50% payout ratio, F significance value appeared as higher than 0.05(5%) so that coefficients of these

²⁰ The set of target pat-out ratio assumptions are identified as 25%, 50% and 75%.

models do not differ than zero²¹. Hypothetically, if these models are postulated as statistically significant, it can be said that lower payout ratio target (25%) produces higher speed of adjustment coefficient (0.2369), in comparison with the model that conducted with 75% of target payout ratio.

Table 15: Regression Analysis of Software & Computer Services Sector, under the 75% Target Payout Ratio Assumption

Regression Statistics					
Multiple R	0.772610609				
R Square	0.596927153				
Adjusted R Square	0.573216985				
Standard Error	0.029394701				
Observations	19				

ANOVA					
	df	SS	MS	F	Significance F
Regression	1	0.021753282	0.021753	25.176	0.000105625
Residual	17	0.014688823	0.000864		
Total	18	0.036442105			

	Coefficients	Standard Error	t Stat	P-value
Intercept	0.002967737	0.011485809	-0.25838	0.799214
C	0.08605699	0.017151132	5.017569	0.000106

In regard to R^2 value, 59.70% of actual dividend change ($D_i - D_{i,t-1}$) is explained by the desired dividend change ($D_i^* - D_{i,t-1}$) and the speed of adjustment reported as 8.61%. Notably, intercept is positive. As a result of slow adjustment and positive intercept, it can be stated that managers are resisted to reducing dividends and they are favour of stable dividend policy.

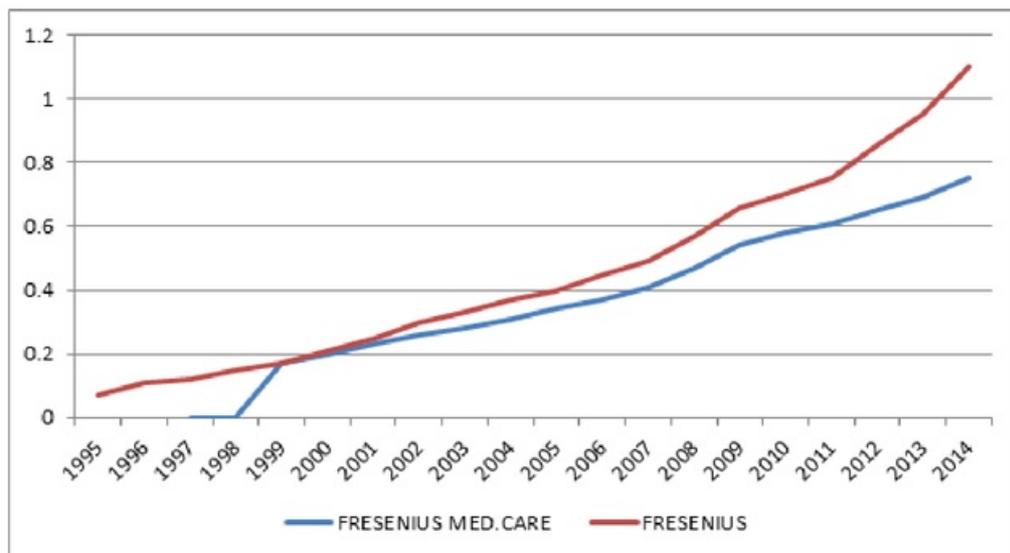
In summary, the company/sector has paid fewer dividends and earned less in comparison with market average of DPS and EPS figures. In regard to adjustment coefficient (0.086), the company trends are stable, it is more reliable to invest in this company during the financially restrictive times. Furthermore, the speed of adjustment coefficient is quite a bit low thus, it can be said that when slow dividend adjustment correspond with the highly volatile EPS the excessively high payout ratios are inevitable as automobile & parts sector experienced. Also, it is observed that, the rise of EPS can only be produced with constantly rising dividends.

²¹ See table 16 and 17 in appendix.

3.1.4. Healthcare Equipment and Services

The sector produces the 3.43% of the market capitalization. There are two companies²² in this sector, and these companies are in same corporation group. So that, the dividend trends are almost identical as it can be seen from figure 14. It is more reliable to analyse aggregate healthcare equipment and services sector that produced from average of both companies' DPS and EPS.

Figure 14: Historical DPS trend of Fresenius and Fresenius Medical Care.

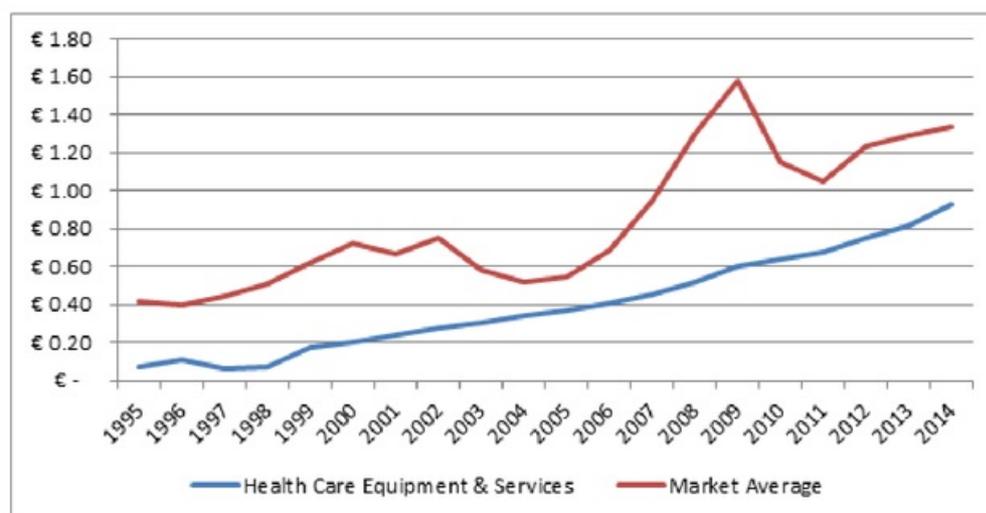


The average sectorial dividend payment calculated as €0.40, which is less than half of the market average. According to figure 15, the dividend payment of the sector has been smoothed since 1999. In figures, the average dividend growth is found to be 15%, during the 2008 and 2009, in comparison with previous years. Following that, the growth is slowed in 2010, which is calculated as 6.67%. In contrast, the market average trend of DPS significantly increased from 2004 to 2009, which is also showed the companies enthusiasm of dividend payment to maintain shareholders confidence, but the dividend payment is also additional cost for companies, so that it cannot be lasted for ever. Thus rapidly adjusted average market DPS ended up with rapid decline between 2009 and 2011. In brief, even though healthcare equipment and services

²² Fresenius and Fresenius Medical Care are the part of Fresenius Health Care Group which internationally produces medical products and services.

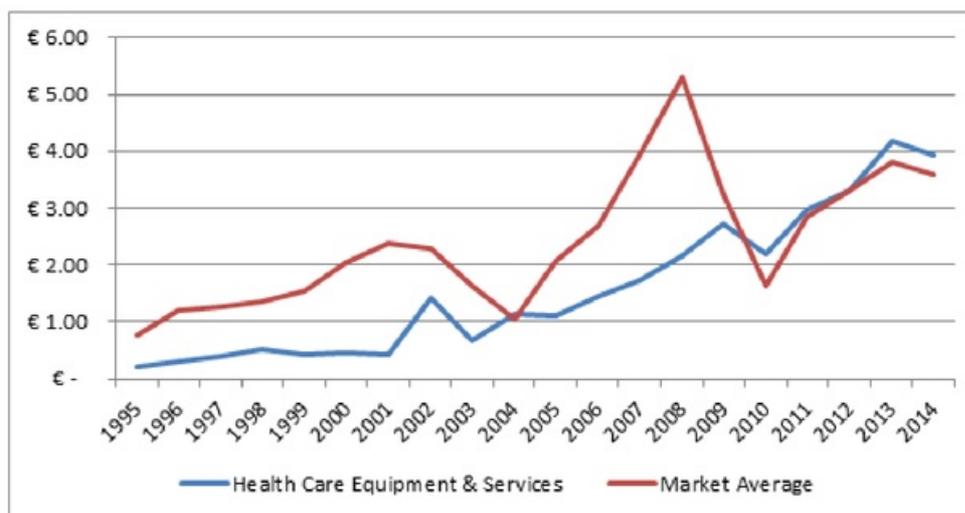
sector's dividend payments are lower than market average, the sector did not reduce the dividends, regardless of the crucial crises factors that occurred beginning of millennium and end of the first decade of 21st century.

Figure 15: Healthcare equipment & services versus Market Average Trend among the DPS



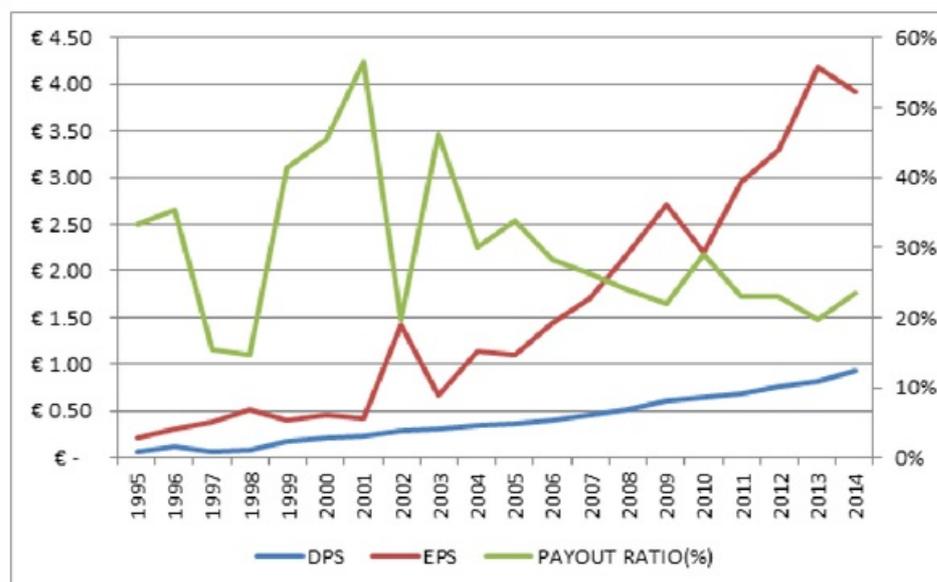
The figure 16 exhibits the EPS overview of the sector and market average trend that is produced by calculating aggregate market figures' average. The earnings of the sector rose between 2003 and 2009. However, the market average trend increased more significantly but it began in 2004, as a year later, and the increment period finished in 2008, as a year early, in comparison with the individual sectorial earnings of the healthcare equipment & services sector. Thus, the market rapid increase of market average trend is followed by severe decline that shows the bubble in the market. Additionally, during the post crisis period, the average sectorial earnings were slightly higher than average market earnings, as respectively, €3.31 and €3.03. Notably, the upward trend of the sector lasted longer than market average trend and the downward lasted shorter than market average.

Figure 16: Healthcare Equipment & Services and Market's average Trend among the EPS



The figure 17 demonstrates the overall aspect of the sectoral DPS, EPS and payout ratio. The excessively fluctuated dividend payout ratio can be seen between 2001 and 2003, because of the rapid EPS increase in comparison with lower DPS growth as mentioned earlier. Following that time period, the increase of EPS is boosted by the constant DPS growth. Furthermore, the average dividend growth rate is found to be 21.32% from 1995 to 2009 and gradually increasing dividends increased the confidence but, the dividend growth rate fell to 6.67% in 2010. Thus the inevitable decrease of EPS occurred in 2010. In other words, the gradually increasing dividend payment per share maintains the earnings per share but if managers adjust the dividends rapidly as a reduction, it causes severe decline in earnings as market average experienced.

Figure 17: Healthcare Equipment & Services' DPS, EPS and Payout Ratio Overview



In contrast to rest of regression models in DAX30 index, the healthcare equipment& services sector model coefficients are statistically significant under the 25%, 50% and 75% target payout ratio assumptions with regard to 5% significance level. The independent coefficients of these models' explanatory powers are reported as respectively, 26.18%, 33.75% and 33.56%.

Table 18: Regression Analysis of Healthcare Equipment & Services Sector, under the 25% Target Payout Ratio Assumption

Regression Statistics	
Multiple R	0.5117
R Square	0.2618
Adjusted R Square	0.2184
Standard Error	0.0297
Observations	19

ANOVA					
	df	SS	MS	F	Significance F
Regression	1	0.0053	0.0053	6.0305	0.0251
Residual	17	0.0149	0.0009		
Total	18	0.0203			

	Coefficients	Standard Error	t Stat	P-value
Intercept	0.0385	0.0073	5.2825	0.0001
C	0.1638	0.0667	2.4557	0.0251

According to table 18, target payout ratio is assumed as 25% and it is stated that, a unit of change on desired dividend change affects as 16.38% adjustment on actual dividends. The speed of adjustment coefficient level is slightly lower than prior research results. Thus, it can be concluded that the dividend adjustment is slow which validates the constant dividend growth as it can be seen from the figure 17. Additionally, the constant term is positive (0.0385).

Table 19: Regression Analysis of Healthcare Equipment & Services Sector, Under the 50% Target Payout Ratio Assumption

<i>Regression Statistics</i>	
Multiple R	0.5809
R Square	0.3375
Adjusted R Square	0.2985
Standard Error	0.0281
Observations	19

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.0068	0.0068	8.6587	0.0091
Residual	17	0.0134	0.0008		
Total	18	0.0203			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	0.0231	0.0098	2.3464	0.0313
DIFF2	0.0484	0.0164	2.9426	0.0091

Table 20: Regression Analysis of Healthcare Equipment & Services Sector, under the 75% Target Payout Ratio Assumption

<i>Regression Statistics</i>	
Multiple R	0.5793
R Square	0.3356
Adjusted R Square	0.2965
Standard Error	0.0281
Observations	19

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.0068	0.0068	8.5855	0.0093
Residual	17	0.0135	0.0008		
Total	18	0.0203			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	0.0215	0.0103	2.0851	0.0525
DIFF4	0.0272	0.0093	2.9301	0.0093

The table 19 and 20 exhibits the regression model that conducted with the 50% and 75% target payout ratio assumption. Both model coefficients are statistically significant and the speed of adjustment levels is found as respectively 4.84% and 2.72%. The regression models' speed of adjustment level is quite a bit low and it can be interpreted that, managers are not rapidly responding to adjust dividends, in case of earnings decline as it occurred in 2009. Hence, lower reaction of dividend adjustment with the case of EPS decline, artificially boosts the payout ratio that can be seen from the figure 17 in 2010. Additionally, the positive constant terms denotes the managerial reluctance of reducing dividends.

To sum up, the healthcare equipment and services sector paid fewer dividends and received less earnings per share. In respect to regression analyses, the appearance of positive intercept supported the argument of managers resistance of dividend reduction. In other words, dividends were paid regardless of the severe financial crisis periods. To elaborate that, when market average trend is compared with the sector, the constantly increasing dividend payment diminishes the negative attitude of investors, which can be understood from the sector's EPS performance that slightly better than market average trend. In other words, the sector's upward dividend trend increase the confidence of the companies in the market and it reflected as higher EPS, especially in post-crisis period.

3.2. Analysis of the France – SBF120

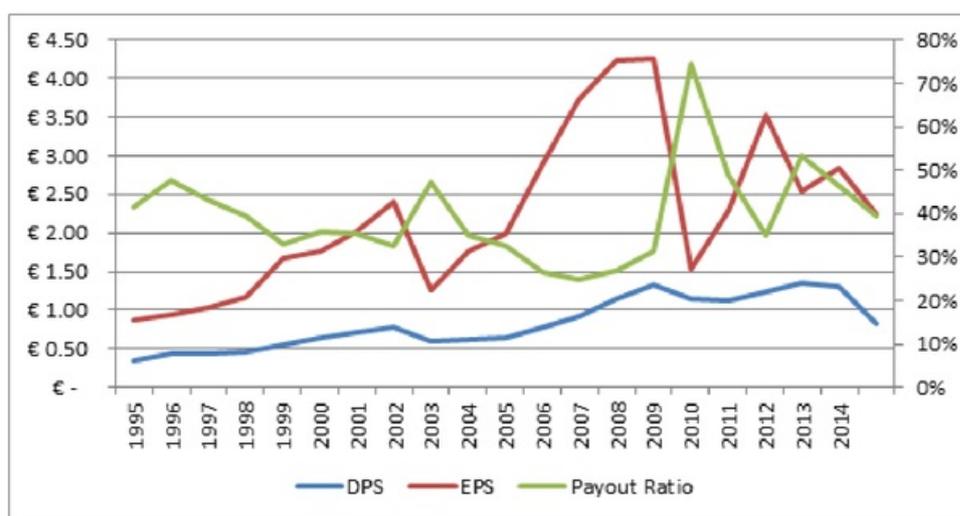
France is one of the important financial centres of the Europe, so that it is essential to analyse dividend and earnings behaviour of constituent companies in SBF120 index as mentioned earlier. There are only 40 large-cap companies in CAC40 and SBF120 contains these 40 large-cap companies. Thus, SBF120 provides more comprehensive overview, in comparison with CAC40.

There 120 companies listed 35 sectors in SBF120 index. Historically, the average dividend payment of the market is found to be as €0.83 per share whilst the average earnings per share calculated as €2.40. As a result of these figures the average payout ratio calculated as 37.06%.

The figure 18 demonstrates the general overview of the stock market among the DPS, EPS and payout ratio. The major axis (left side) is for DPS and EPS observation

whilst the mirror axis (right side) is for the plot of payout ratio. It is clear that dividends smoothed between 2003 and 2009, which covers the boom period and core crisis periods. During the boom time, average dividend growth rate calculated as 9.13% and then in the core crisis horizon the average dividend growth is found to be 19.91%, which is two times more than boom time's growth figure. Therefore, it can be said that, most of the companies have increased the dividend growth to diminish the negative attitude of the shareholders. The higher dividend growth rate influenced the payout ratio from 24.82% to 31.42% in the crisis period (2007-2009). As a result of these movements, throughout the core crisis period the EPS rose from €3.73 to €4.27. Following the core crisis period, the decrease in dividends resulted as sharper decline among the EPS, in 2010. The more rapid decrease of the EPS appeared as the more rapid increase on the payout ratio. Thus the payout ratio is extremely increased to 74.63% as historical record level. The significant dividend payment delayed the inevitable downward trend of average EPS during the 2007-2009. In 2010, the dividends are slightly reduced with regard to variety of factors, and the decline of DPS caused a sharp EPS decline. Following that, the aggregate market maintained the dividends and it led to rise on EPS trend. In brief, concurrent increase and decrease of DPS and EPS shows that, the higher dividend payment accelerates the earnings, on the contrary, the decline on the dividends trend lead to sever decrease on the earnings trend.

Figure 18: The overview of France (SBF120), among the DPS, EPS and Payout ratio.



Then, the market average of DPS and EPS figures is investigated by using the partial adjustment with regard to equation (3). The coefficients has been tested with the set of target payout ratio at 25%, 50% and 75%. It is observed that, only the regression model that conducted with 25% target payout ratio is found as statistically significant with respect to P and F values that lower than 5% significance level. Other two models' coefficients are not significant under the 5% significance level, so that, the coefficients do not differ than zero²³.

Table 21: Regression Analysis of SBF120 with 25% of Target Payout Ratio

<i>Regression Statistics</i>	
Multiple R	0.7535
R Square	0.5677
Adjusted R Square	0.5423
Standard Error	0.0736
Observations	19

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.1209	0.1209	22.3254	0.000196
Residual	17	0.0920	0.0054		
Total	18	0.2129			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	0.1143	0.0216	5.2837	0.000061
C	0.2824	0.0598	4.7250	0.000196

The table 21 shows regression results under the 25% of target payout ratio assumption. since P and F values quite close to zero, coefficients are meaningful for the regression analysis. The results showed that, desired dividend change ($D_{it}^* - D_{i,t-1}$) explains 56.77% of actual dividend change ($D_i - D_{i,t-1}$), in respect to R^2 value. The reaction coefficient is found to be 0.2824. Thus, it can be concluded that, a unit of desired dividend change positively adjusts 28.24% of actual dividend change. Also, speed of adjustment coefficient is similar to prior researches in the literature that has been showed in table 2. Additionally, the managerial resistance to reduce dividends can be validated by the positive intercept (0.1143).

In the following sections, the study has examined the sectorial dividend behaviours and dividend adjustments of four sectors. The sectorial figures illustrate the individual companies' figures' average. The chemicals sector and the food & drug

²³ See table 22 and 23 in appendix.

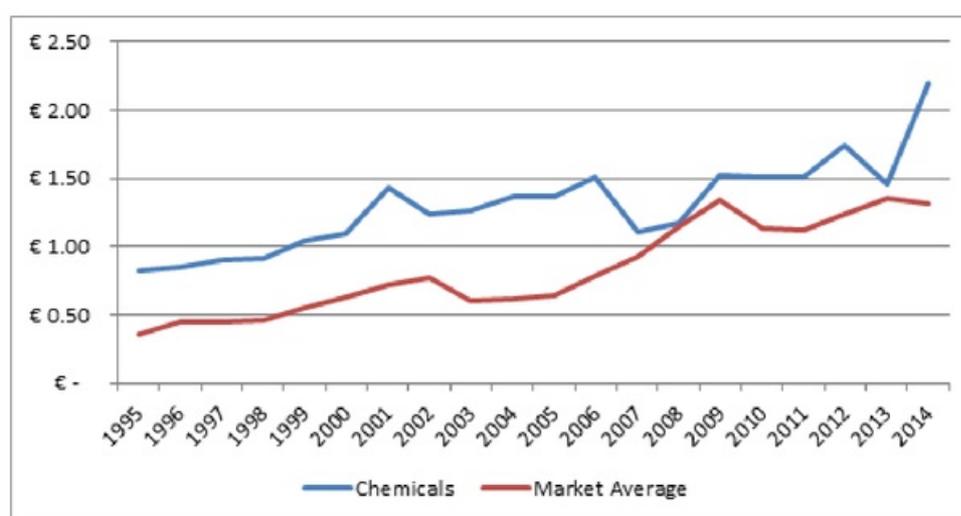
retailers sector will be analysed as high dividend-paying sectors. In contrary to the high dividend-paying sector, the healthcare equipment & services sector and the software & computer services sector will be considered as the low dividend-paying sectors.

3.1.1. Chemicals Sector

There are three companies are constituent in SBF120 index of France. The chemical sector's figures produced from average of these three companies' DPS, EPS and payout ratio figures. The chemicals sector produces 3.16% of market capitalization.

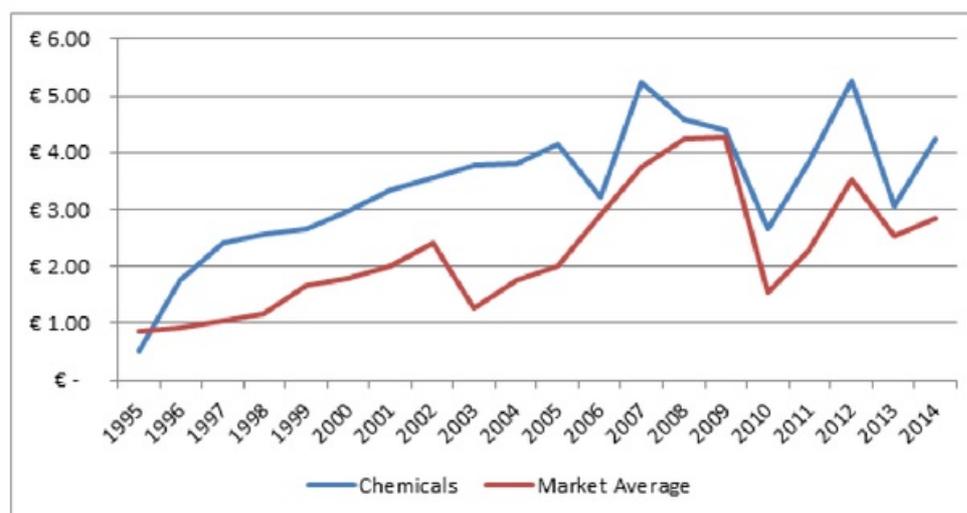
Historically, chemical sector's average dividend payment is found to be €1.30, meanwhile, the market's average dividend payment as €0.83. The figure 19 demonstrates the comparison of average market trend and individual chemicals sector trend. The DPS trend of chemical sector smoothed from 2002 to 2006. Subsequently, it declined in 2007, while market average of DPS increasing significantly. The slight dividend growth rate reported as 5.41% in 2008, which followed by 30.48% in 2009. The dividend payment almost levelled out between 2009 and 2011, meanwhile, the market average trend's decline reported as 8.56%. Regardless of decrease in the initial year of core crisis period (2007-2009), the chemical sector's average DPS calculated as €1.27 in crisis horizon and it is higher than average DPS of market in identical time period.

Figure 19: DPS Overview of Chemicals Sector and Market Average as general market trend



The figure 20 exhibits the fluctuation of EPS for the chemical sector and market average trends. The EPS of sector and market average calculated as €3.40 and €2.24, respectively. The chemical sector's EPS significantly escalated from 1995 to 2005, regardless of the dot.com crisis between 1999 and 2001. In 2006, the chemical sector's EPS unexpectedly decreased, however, it is identified that, company specific issues²⁴ affected the aggregate sector. Following that, EPS significantly increased until 2007 and subsequent decreases followed that. In the EPS history of the sector, one of the deeper decline occurred in 2010, from €4.26 to €2.65, in other words 39.62% of the earnings disappeared within a year. Meanwhile, it is observed that, in 2010 the downward trend of market average of EPS more deeply declined in comparison with chemical sector. In figures, 64.24% of earnings disappeared. Then, the chemicals sector and market average identically fluctuated for following years.

Figure 20: EPS Overview of Chemicals Sector and General Market Trend as Market Average

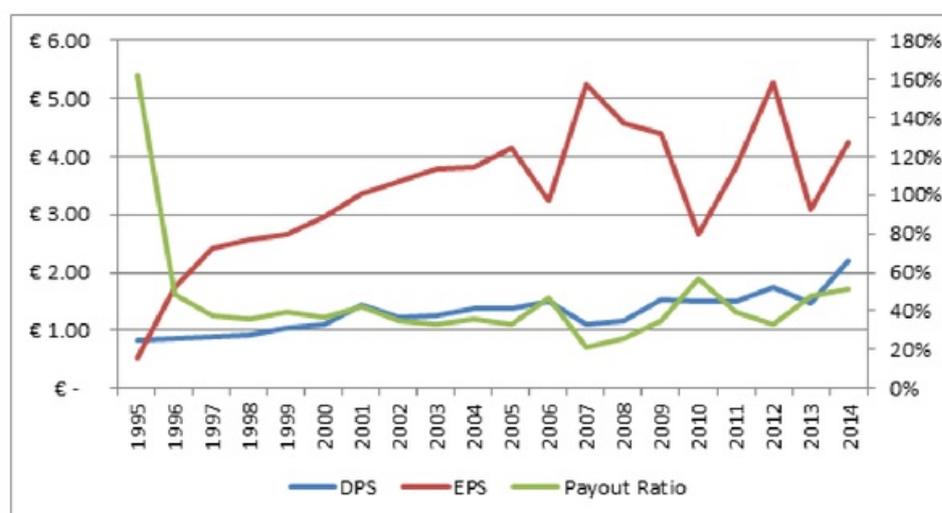


The figure 21 illustrates the individual components of the sector. The left hand side major axis is for DPS and EPS observation whilst the right hand side axis is for the plot of payout ratio. To begin with, the extremely higher EPS rate suppresses DPS and payout ratio on the graph. However, it is observed that, EPS increases with the smooth dividend payment until 2005. In 2006 the increase of DPS diminished the negative

²⁴Almost 50% of the Solvay's EPS disappeared, in 2006, see table 36 in appendix.

attitude of investors and paused the EPS fall. Following years, the EPS significantly increased with the momentum of DPS until 2007. Subsequently, earnings are decreased in the first year of core crisis period with 26.49% decrease of DPS. Yet, the 5.41% of DPS rise slowed the fall of EPS in 2008. Thus, the sectorial earnings did not decrease as much as market average trend of EPS. The sector maintained the dividends instead of reduction between 2008 and 2010. Hence, the earnings are bounced back after 2010. Additionally, the payout ratio appeared on the downward trend in concurrent time horizon when EPS on upward trend because, even slight dividend increase lead more volatile EPS trend. So that, in accordance with payout ratio formula, higher EPS lead to lower payout ratio with regard to constant DPS.

Figure 21: DPS, EPS and payout ratio Fluctuation of Chemicals Sector



The coefficients were tested with partial adjustment model with the set of target payout ratio assumptions as specified earlier. In regard to regression analysis results, the coefficients of the regression model statistically insignificant under the 5% significance level²⁵. To elaborate these results, all three of the models *F significance* value is excessively higher than significance level under the set of assumed target payout ratios.

²⁵ See table 24, 25 and 26 in appendix.

To support that, these regression models' independent coefficients explanatory power is also quite low, in respect to R^2 value.

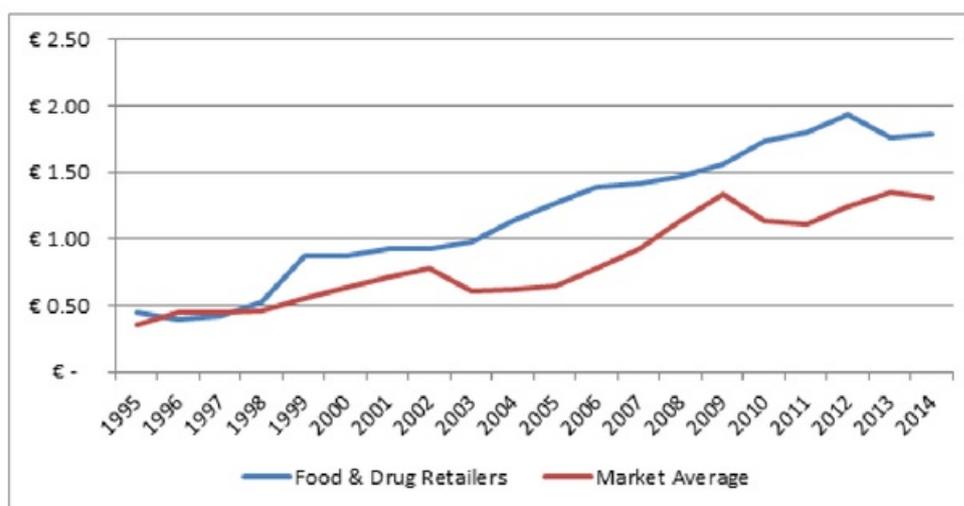
To conclude, the chemicals sectors payout ratio is appeared as higher than aggregate market's average (respectively, 44.78% and 37.06%) and it is close to Lintner(1956) efficient payout ratio. Consequently, sectorial earnings are higher than average market earnings per share (respectively, €3.40 and €2.24). The rises of dividends are considered as a dividend initiation and it reflected as upward trend on EPS. Also, EPS is more volatile than DPS; thus, the payout ratio appears as an inverse trend to EPS. These graph conclusions can be only be taken into account with the influence of dividend literature, however when *partial adjustment model* is applied, the coefficients could not reach the 5% significance level, perhaps sample size is not enough and/or there are other main factors affect the companies' dividend considerations. Hypothetically, if the regression models are postulated as statistically significant, it is clear that, the higher the target payout ratio the lower the the speed of adjustment coefficient as rest of test results.

3.1.2. Food and Drug Retailers

Food and drug retailers sector is one of the high dividend-paying sector in SBF120 index of France. The sector produces 2% of market capitalization. There are two companies in this sector, namely, Carrefour SA and Casino GuichardPerrachon SA. Both of the companies have an identical trend, so that it is more reliable to analyse the average of these companies EPS and DPS, which is also produces the food & drug retailers figures.

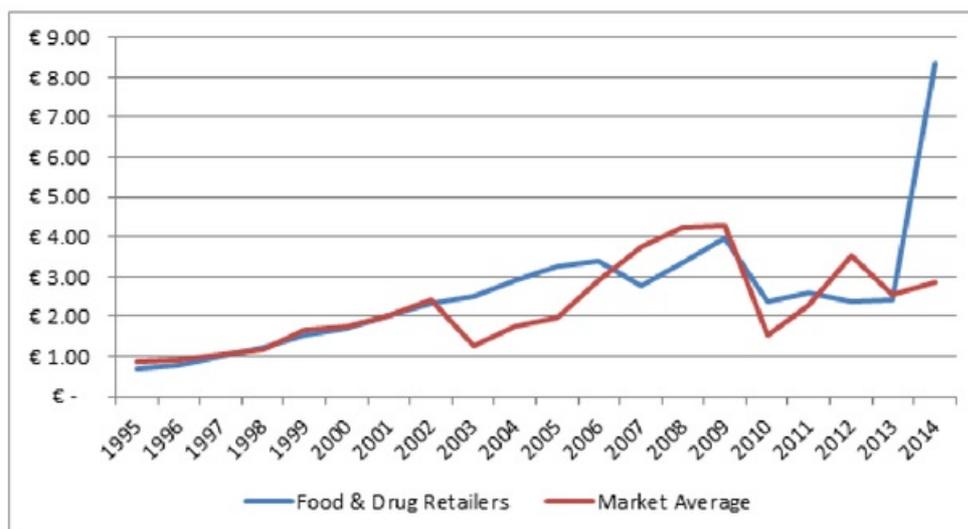
The sector has, on average, paid more dividends than market average, the figures found as respectively, €1.18 and €0.83. The figure 22 shows the comparison of food & drug retailers sector and aggregate market's average of the DPS. It is observed that, there is a significant increase on the dividend trend, regardless of the crises periods. Also it can be said that the sector did not reduce the dividends as pointed out by Lintner (1956). On the contrary, the rest of the market reduced the dividends, during the post-crisis period.

Figure 22: DPS Fluctuation of Food & Drug Retailers Sector and Market Average as General Market Trend



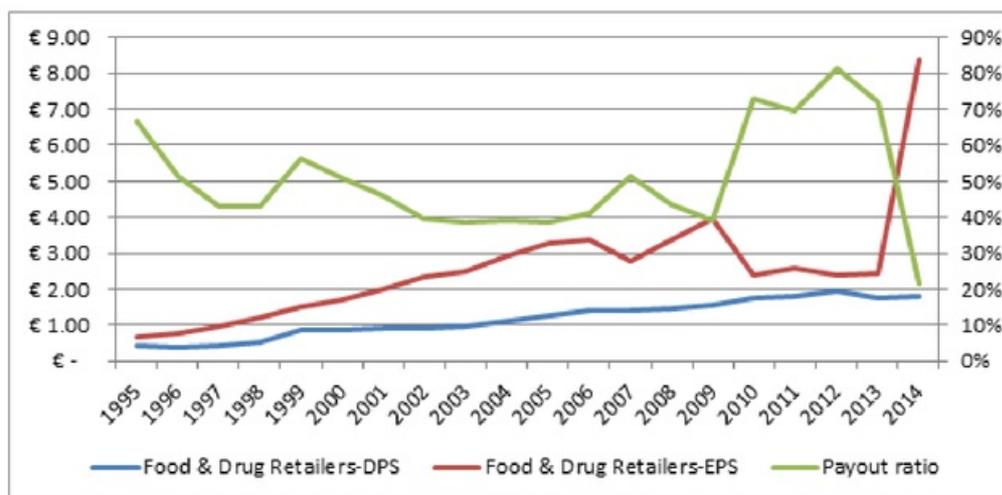
Generally, high dividend-paying sectors received higher earnings and this sector also consistent with that finding. The earnings per share of the sector and market average are found to be €2.58 and €2.24, respectively. According to the figure 23, EPS rates of the sector and market average were quite identical until, 2002. Subsequently, the sectorial EPS significantly increased with same pace until 2006. However, average market trend decreased in 200 and then increased more faster than the sector until 2008. During the core crisis period, food & drug retailers increased the EPS, from €2.77 to €3.97. Additionally, the average growth rate is calculated as 19.84%, meanwhile, the market average trend's average growth rate calculated as 7.07%. The market average trend showed historically higher peak during the crisis period but it is declined more than the sector in 2010. As last, the sectorial earnings levelled out until 2013 and increased to historically record level in 2014.

Figure 23: EPS Overview of Food & Drug Retailers Sector and Market Average as General Market Trend



Likewise, figure 24 demonstrates the clear relationship of EPS, DPS and payout ratio as a result of DPS and EPS. It is observed that, dividends are smoothed throughout the specified time horizon in the graph. In 2006, regardless of 18.56% EPS decrease, food & drug retailers' managers did not reduce the dividends. Thus, that decision influence the following year as 21.52% growth on the earnings per share. The setor managers preserved the reluctance of dividend reducing or cutting policy in the core crisis period (2007-2009). Therefore, the EPS growth was not paused until 2009, in figures, dividend payment is increased 11.22%, regardless of 40.05% decrease. In contrast, the general market trend dividends declined 15.06% and it led to 64.24% decrease. So that, in 2010, the higher dividend payment of the food & drug retailers sector mitigated the sharp decrease as it occurred in market average trend. Additionally, lower EPS rates with constant dividend payment caused extremely higher payout ratio such as 81.43% in 2012

Figure 24: Food & Drug Retailers Sector Overview among the DPS, EPS and Payout Ratio



Then, the regression analyses have been individually tested at 25%, 50% and 75% of target payout ratios to examine its influence of target payout ratio on the speed of dividend adjustment. According to regression results, two issues are observed. Firstly, independent coefficients' explanatory power on dependent coefficient is quite a bit low with regard to the R^2 value. In figures, the models R^2 values are found to be as respectively, 4.62%, 1.5% and 0.49%. Secondly, F significance of the models coefficients are larger than 5% significance level, therefore coefficients do not have meanings and/or do not differ than zero²⁶.

In conclusion, despite the crises periods, dividends have been smoothed since 1995. In accordance with regression analyses results, statistically all the models are insignificant. Perhaps, the sample size is not large enough and/or companies dividend adjustments are depend on different factors. However, in accordance with the dividend literature aspect, food & drug retailers' higher dividend payment mitigated sharp declines on EPS as market average trend experienced. In other words, during the recent core crisis period (2007-2009), if food & drug retailers sector did not increase the dividends, perhaps the fall of EPS could have been worsen, as it occurred in market average trend, in 2010.

²⁶ See table 27, 28 and 29.

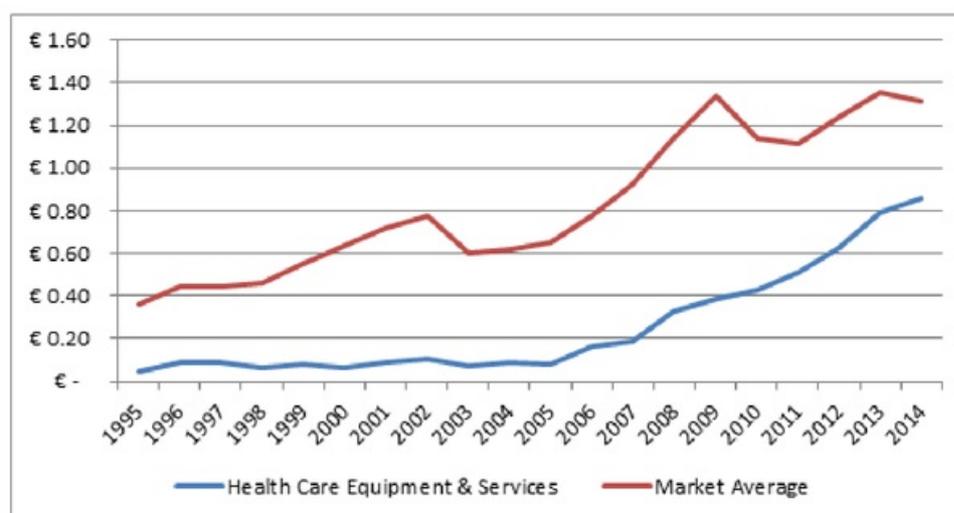
3.1.3. Healthcare Equipment & Services Sector

There are six companies are identified in healthcare equipment & services within SBF120 index. The healthcare equipment & services sector produced the 1.82% of total market capitalization in France.

The healthcare equipment & services sector have, on average, paid €0.25 as dividend per share. The sectorial earnings are calculated as €1.09 per share. As a result of these components, payout ratio calculated as 23.43% which is far fewer than Lintner (1956) efficient payout ratio. On the contrary, the aggregate market's average dividends and earnings per share is found to be €0.82 and €2.23, respectively. Additionally, the payout ratio is calculated as 37.06%.

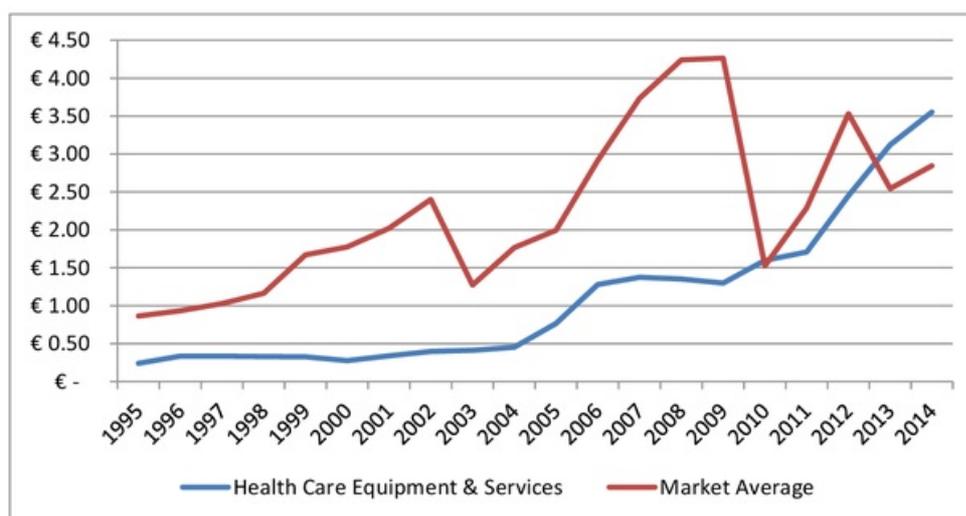
Figure 25 demonstrates the DPS overview of the sector and market average trend. Healthcare equipment & services sector's dividend payments were almost stable, from 1995 to 2005. Meanwhile, DPS market average of DPS increased from €0.35 to €0.28, regardless of the 22.45% decrease in 2003. Following years, the upward trend of healthcare & equipment sector has steeply increased without any pause. Concurrently, the market average trend increase more significantly but the momentum paused in 2010 as a sharp reduction of dividend. In brief, aggregate market is more volatile than the sector.

Figure 25: DPS Overview of Healthcare Equipment & Services Sector and Market Average as General Market Trend



According to the figure 26, the sector's earnings per shares reported as stable as similar to DPS trend. Following that, it significantly rose from €0.45 to €1.28 from 2004 to 2006. However, slight decline²⁷ is identified along with the core crisis period that specified as 2007-09. Meantime, the general market trend significantly increased during the crisis period. Then, in contrary to the sectorial EPS, the market average trend plummeted from €4.27 to €1.52. Briefly, the historical average of sectorial earnings are quite lower than market average, yet as a percentage the sectorial earnings per share did not declined as much as general market earnings per share, during the crisis period (2007-2009).

Figure 26: EPS Overview of Healthcare Equipment & Services Sector and Market Average as General Market Trend

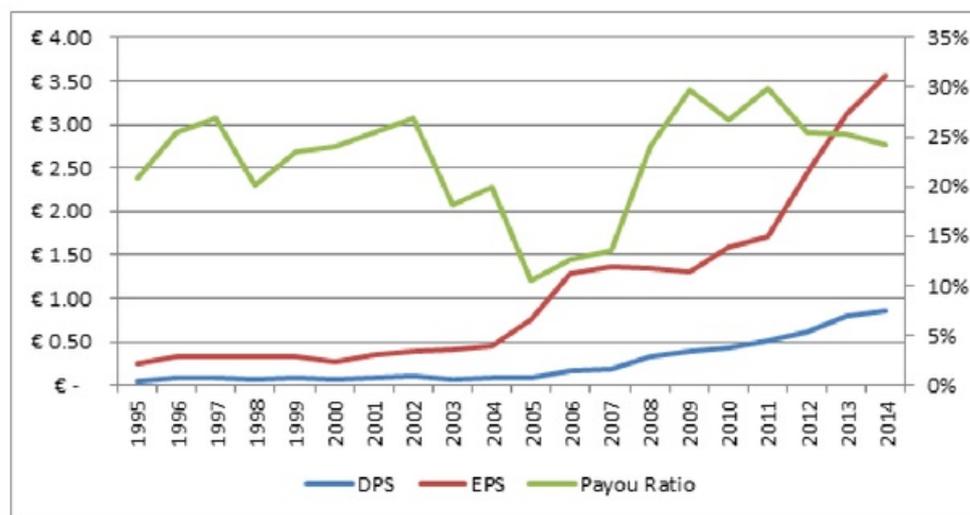


Then, figure 27 exhibits the comprehensive and individual overview of healthcare equipment & services sector's figures, such as DPS, EPS and payout ratio. DPS and EPS are plotted on the left hand side vertical axis and payout ratio is plotted on right hand side vertical axis. The sector's EPS began to rise in 2004 with the influence of the boom period from 2004 to 2006. The increase of earnings supported with the dividend increase in 2005, it is also observed from upward trend of payout ratio. Subsequently, earnings are slightly declined from 2007 to 2009. Also the sector's managers did not reduce the dividends, which can be understood from average dividend

²⁷ The healthcare equipment & services sector DPS trend declined from 1.37 to 1.29, between 2007 and 2009.

growth rate that found to be 36.10% between 2007 and 2009. Thus, the significantly increasing DPS trend mitigated the fall on the EPS trend.

Figure 27: Healthcare Equipment & Services Sector Overview among the DPS, EPS and Payout Ratio



The regression analyses have investigated with 25%, 50% and 75% of target payout ratio levels to test its impact over the speed of adjustment coefficient. Contrary to high dividend-paying sectors that have been examined above, healthcare equipment and services sector's coefficients are found statistically significant at 5% significance level with regard to the 25%, 50% and 75% of target payout ratio assumptions. Notably, the statistical significance of the all three models are consistent with the same sector in DAX30 index of Germany.

Table 30: Regression Analysis of the Healthcare Equipment & Services Sector(France) with 25% of Target Payout Ratio Assumption

<i>Regression Statistics</i>	
Multiple R	0.5824
R Square	0.3392
Adjusted R Square	0.3003
Standard Error	0.0457
Observations	19

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.0182	0.0182	8.7252	0.0089
Residual	17	0.0354	0.0021		
Total	18	0.0536			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	0.0174	0.0135	1.2856	0.2158
C	0.4190	0.1418	2.9539	0.0089

The table 30 demonstrates the regression analysis under the 25% target payout ratio assumption. According to value of determination coefficient(R^2), the independent coefficient explains only 33.92% of the dependent coefficient. The size of the sample may not be enough to explain the depended coefficient. Therefore, R^2 value appears at the lower rates. The regression analysis results showed that, the speed of adjustment coefficient is found to be 0.4190. Hence a unit of desired dividend change adjusts 41.90% of actual dividend change. Also positive intercept shows the managerial resistance of dividend cut, under the assumption of 25% payout ratio target.

Table 31: Regression Analysis of the Healthcare Equipment & Services Sector(France) with 50% of Target Payout Ratio Assumption

<i>Regression Statistics</i>	
Multiple R	0.7903
R Square	0.6245
Adjusted R Square	0.6025
Standard Error	0.0344
Observations	19.0000

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.0335	0.0335	28.2783	0.0000567
Residual	17	0.0201	0.0012		
Total	18	0.0536			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	-0.0080	0.0124	-0.6472	0.5262
C	0.1464	0.0275	5.3177	0.0000567

On the table above, the regression analysis of healthcare equipment & services sector is demonstrated, under the assumption of 50% payout ratio target. The 62.45% of actual dividend change ($D_i - D_{i,t-1}$) is explained by the desired change of dividends ($D_{it}^* - D_{i,t-1}$) with regard to the R^2 value. The speed of adjustment coefficient is found as 0.1464 and it denotes that, the speed of actual dividend change is 14.64%, in regard to each unit of adjustment on desired dividend change. Also, the intercept is slightly negative, when companies aimed to payout 50%.

Table 32: Regression Analysis of the Healthcare Equipment & Services Sector(France) with 75% of Target Payout Ratio Assumption

<i>Regression Statistics</i>	
Multiple R	0.7803
R Square	0.6089
Adjusted R Square	0.5859
Standard Error	0.0351
Observations	19

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.0326	0.0326	26.4698	0.000081
Residual	17	0.0210	0.0012		
Total	18	0.0536			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	-0.0072	0.0126	-0.5687	0.5770
C	0.0788	0.0153	5.1449	0.000081

According to regression analysis results at the table above, 60.89% of actual dividend changes ($D_i - D_{i,t-1}$) are explained by the desired dividend change ($D_{it}^* - D_{i,t-1}$). If the payout ratio is considered as 75%, the speed of desired dividend change adjusts 7.88% of actual dividend change. In brief the managerial reaction is quite slow in case of earnings change. Yet, managers are not completely reluctant to cut dividends in respect to just slightly negative constant term (-0.0072).

To summarise, in comparison with the market average of DPS and EPS, the sector's dividend payment is quite low, consequently, earnings are lower either. Besides, according to aggregate market figures, when dividend payment is reduced, EPS is immediately plummeted, the decline in 2009-10 can be considered as a sample period. In contrast to market average trend, the health equipment & services sector dividends were not reduced as much as market average in the core crisis period(2007-

2009). Thus, the sector experienced only slight decrease of EPS, instead of sharp decline as market average trend experienced. The gradually increasing DPS can be considered as dividend initiation to investors that mitigate the sharp downward trend. According to the regression analysis results, the higher payout ratio leads to the lower adjustment speed. Perhaps, managers are more enthusiastic for stable dividend payment instead rapid adjustments. To elaborate that, regardless of the first econometric model, which is conducted with 25% payout ratio, the lower speed of adjustment coefficients (respectively, 0.1464 and 0.0788) denote the companies prefer more stable dividends instead of frequent fluctuations. Thus, the DPS trend of the sector has approved by regression analysis results under 50% and 75% of target payout ratio assumption.

3.1.4. Support Services Sector

The support services sector has paid lowest²⁸ dividend on list of the dividend-paying companies. There are three companies in the support services sector and they produce the 1.17% of total market capitalization in SBF120 index of France.

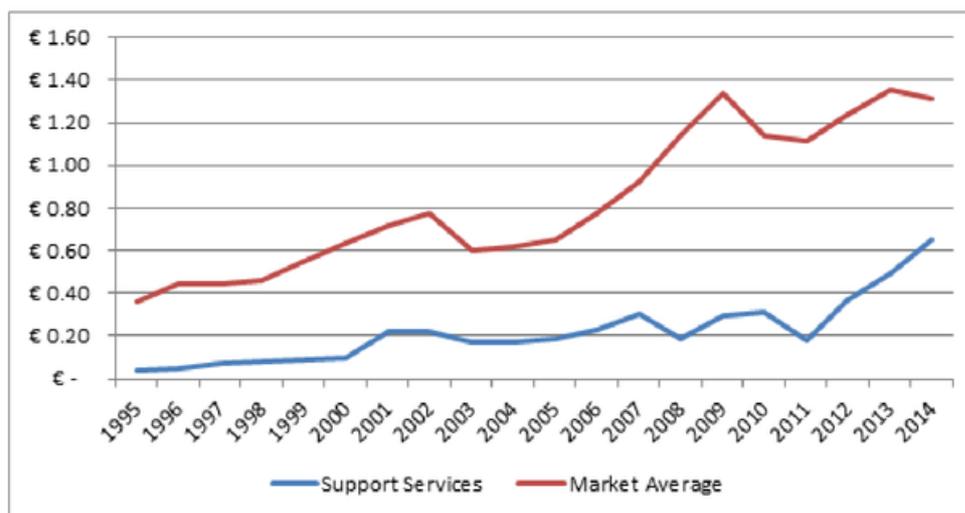
To begin with, the sector has, on average, paid €0.22, as dividend per share. The sectorial average earnings per share are calculated as €0.74. As a result of these figures, payout ratio calculated as 29.86%. Additionally, the average market figures²⁹ are quite a bit high in comparison with the support services sector.

Next, according to the figure 28, the sectorial dividends increased until 2001. After that, it is stabilized for a year, while general market trend rising without pause until 2002. In 2003, the upward trend is observed on both lines. When core crisis period (2007-2009) analysed, it is found that, the sector reduced the dividends in 2007 and then increased until 2009. Meantime, according to market average figures dividends are not reduced, as general market trend. Subsequently, the support services sector DPS fluctuation is followed by steep rise, between 2011 and 2014. Briefly, while general market increasing dividends, the support service sector dividends are fluctuated.

²⁸ Leisure goods sector is a non-dividend-paying sector therefore it is excluded from the list of the companies that pay dividends.

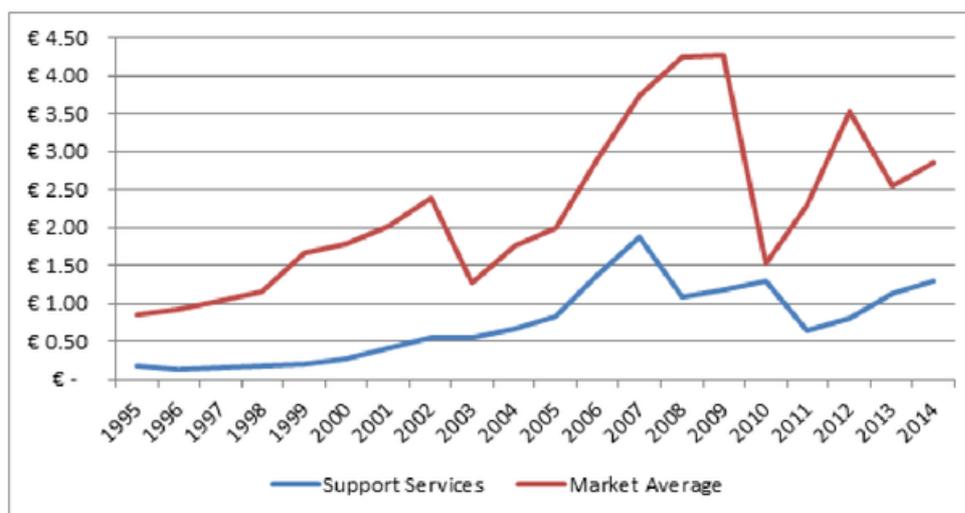
²⁹ The aggregate market's average DPS, EPS and payout ratio calculated as, respectively, €0.83, €2.24 and 37.06%

Figure 28: DPS Fluctuation of Support Services Sector and Market Average as general market trend



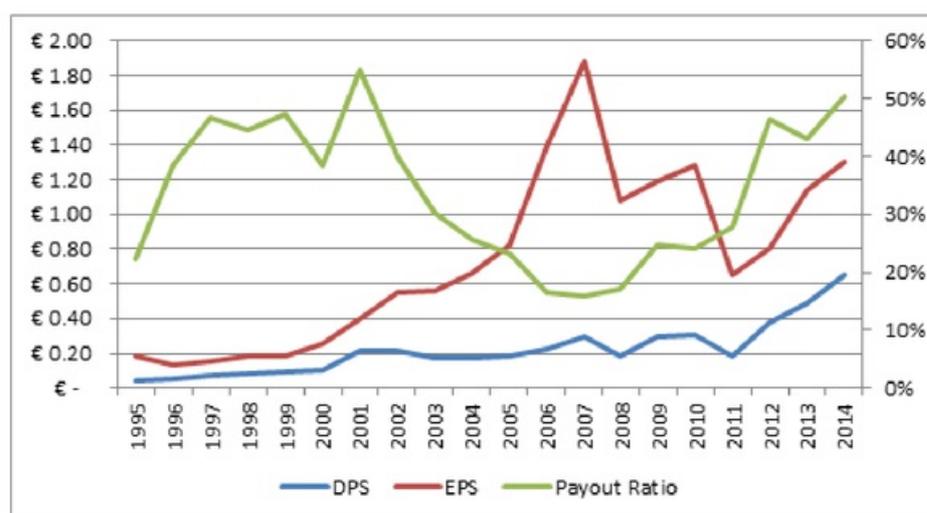
The figure 29 compares the earnings per share of the support services sector and market average, which are produced from aggregate market's average earnings per shares. It is observed that, the sectorial earnings are significantly increased until 2007. Notably, between 2005 and 2007 the growth level of EPS is quite a bit higher than previous years. Additionally, the sectorial and general market's EPS trends differs, particularly in core crisis period (2007-2009).

Figure 29: EPS overview of support services sector and market average as general market trend



The figure 13 sketches the individual overview of the support services sector among the DPS, EPS and payout ratio. DPS and EPS are plotted on the left hand side vertical axis and payout ratio on the right hand side vertical axis. In 2001, the EPS and DPS growth levels calculated as 53.85% and 120%, as respectively. The extremely higher dividend growth led payout ratio to reach peak. Yet, in following years, earnings are increased and dividends are levelled out with the influence of boom period. Subsequently, support services sector companies' managers reduced the 38.33% of dividends and it caused 42.55% EPS decline. After that, dividends are increased as 59.46% and it boosted to earnings as 10.19% in 2008. The upward trend of earnings continued until the next dividend reduction, in 2011. As a result of 41.94% dividend cut, 49.42% earning disappeared in 2010-11 period. Nevertheless, payout ratio artificially increased from 24.12% to 27.69%, because of faster earnings increase that explained earlier.

Figure 30: Support Services Sector Overview among the DPS, EPS and Payout Ratio



The regression model is conducted with the data set of service sector at 25%, 50% and 75% of target payout ratio assumption. The different payout ratio target levels will provide in-depth understanding on the target payout ratio influence over the speed of dividend adjustment.

The regression results showed that, individual regression models' coefficients are insignificant under the 5% significance level. Also, these models' independent coefficients explanatory power is reported as orderly, 4.87%, 8.42% and 8.41%, in

regard to R^2 values³⁰. In brief the explanatory power is quite low with regard to determination coefficient (R^2).

To sum up, in comparison with the market average, the support service sector pays fewer dividends per share. As a consequence of that, earnings per share also lower. The overall market figures showed that, market is more volatile than the sector. As a result of the comparisons and analyses, when dividends are reduced, earnings are decreasing; the trends in 2007-08 and 2010-11 can be taken as supportive arguments to this claim, which also consistent with healthcare equipment & services sector. Also, when DPS adjustment speed is lower, the rapid EPS drop causes extremely high payout ratio, which can be seen along with the 2010-11 horizons. However, these interpretations can only be validated under the dividend literature hypotheses but, when the regression analyses are taken into account with the data set of support service companies, between 1995 and 2014; the regression models are statistically insignificant. Possibly, the size of sample is not large enough to provide explanatory power at the 5% significance level and/or the support service companies dividend adjustment have been influenced by other factors. Yet, if the models are postulated as statistically significant, three conclusion can be stated as follow; firstly, managers are reluctant to cut dividends in regard to positive constant term, secondly, the speed of dividend adjustments are quite slow in comparison with previous research result in table 2. Finally, it is observed that, the higher target payout ratio assumption produced lower adjustment coefficient, which is consistent with rest of the models that tested in this research. Perhaps managers are less willing to do frequent dividend adjustments.

4. Conclusion

In the literature there are numerous studies that investigated the dividend behaviours and most of them are based upon the UK and US companies. Particularly, the study of Lintner (1956) reports that managers commonly reluctant to reduce dividends. It is also identified that the firm managers pay close attention on the stability of dividends instead of frequent dividend adjustment.

In this paper, the behaviours of the dividends are investigated from the payout ratios and earnings of listed companies in Germany and France. The data set based on

³⁰ See table 33, 34 and 35 in appendix.

constituent companies in the DAX30 index of Germany and SBF120 index of France as case studies of the Eurozone countries.

The average dividend per share, earnings per share and payout ratio figures of 30 large-cap companies listed in DAX30 index are calculated using arithmetic mean (AM). The average payout ratio of DAX30 index is found to be 34.99%, which is lower than the Lintner's efficient long-term payout ratio that was reported at 50%. The regression model of the aggregate market showed that, the model coefficients are only statistically significant under the 25% target payout ratio and the speed of adjustment coefficient is found to be 0.4005. According to speed of adjustment coefficient, the average dividend payment trend is quite volatile in comparison with lower sectors that have low speed of adjustment coefficient. The constant term is found to be 0.1253 that shows the managerial resistance of the dividend reduction and/or cut. Furthermore, the regression model's speed of adjustment coefficient appeared quite high in comparison with 0.30 reported in Lintner (1956) original finding and that of Behm and Zimmerman's (1993) finding that is found to be between 0.13 and 0.26. Perhaps the reason of high speed of adjustment coefficient can be explained by the lower target payout ratio because manager tend to adjust dividends more rapidly with low target payout ratio

In case of Germany there are four individual sectors. After the careful consideration of all sectors, the automobile & parts, general industrial, software & computer services and healthcare equipment & services sectors have been chosen with regard to dividend payment. The automobile & parts and general industrial grouped as high dividend-paying sectors whilst software & computer services and healthcare equipment & services sectors are considered as low dividend-paying sectors.

The automobile & parts sector has, on average, paid more dividends and received more company earnings per share in comparison with the average of aggregate market. Noticeably, the sector has paid higher dividends during the core crisis period (2007-2009) to motivate the shareholders. The partial adjustment model of automobile & parts sector coefficients has found statistically significant under the 50% and 75% of target payout ratio assumption. As a result of these regression models, the speed of adjustment coefficients are found slightly lower than prior research results³¹. The regression results showed that, the managerial reaction of the dividend change is quite

³¹ See table 2.

slow in the case of severe changes on the corporate earnings. Hence, the payout ratio appears as artificially high in 2010. Thus artificially high payout ratio did not boost the corporate earnings as dividends boosted.

It is observed that the general industrials sector paid, on average, more dividends per share than aggregate market average. Thus, the earnings per share are also higher than market average. The regression coefficient is statistically significant under the 50% target payout ratio assumption as estimated by Lintner (1956). Furthermore, the speed of adjustment coefficient is also quite a bit low in comparison with Behm and Zimmerman (1993) findings. The regression analysis showed that, the reaction speed is quite slow. Thus, it can be concluded that general industrials sector managers prefer the stable dividend payment, which can particularly be seen from both *dot.com* and *sub-prime mortgage* crisis periods. In short, the sector managers tend to avoid rapid dividend adjustments and resist reducing dividends as illustrated by positive constant term that is found to be 0.0429.

The software & computer services sector is one of the lowest dividend-paying sector in DAX30 index which corresponds to its lower sectorial earnings. According to regression the analysis, the speed of adjustment is found to be 0.0861, which is lower than the results of previous research and analysis of aggregate DAX30 index's adjustment speed. The regression results are showed that, the dividend adjustment reaction is low and it reflects as slowly smoothing dividend trend that can be understood from the time horizon between 1995 and 2007³². To support that argument, the positive intercept also shows the managerial reluctance of dividend reduction in software & computer services sector. Additionally, the artificially high payout ratio is observed with same logic as mentioned earlier.

The healthcare equipment and services sector has, on average, paid less dividends per share and received fewer earnings per share in comparison with aggregate market average of DPS and EPS. In regard to regression analyses of healthcare equipment & services sector, the model coefficients are statistically significant under the all three target payout ratio assumptions. The speed of dividend adjustment coefficients is found to be slow in comparison with the other sectors' regression analysis results in the German stock market. Additionally, the regression models that

³² See figure 2.

conducted with 50% and 75% target payout ratio assumption produced slow dividend adjustment movements, which significantly approve the smoothing dividend with almost stable growth rate.

In case of France, the study has been conducted the investigation on listed companies in the SBF120 index from 1995 to 2014. The average payout ratio of the aggregate market is found to be 37.06%, which is slightly higher than DAX30 index and lower than findings of McDonald et al. (1975)³³. According to the regression analysis, the statistical significance of the coefficient can only be validated with 25% target payout ratio assumption as similar to DAX30. The regression analysis results showed that speed of adjustment coefficient is consistent with the findings of McDonald et al. (1975). Additionally, the speed of reaction is lower than DAX30 index. Therefore, the dividend trend did not fluctuate as much as DAX30 index and the constant terms of both indices are quite similarly approving the managerial resistance of dividend reducing and/or cutting.

In case of Germany there are four individual sectors. After the careful consideration of all sectors, the chemicals, food & drug retailers, healthcare equipment & services and support services sectors have been chosen with regard to dividend payment. The chemicals, food & drug retailers grouped as high dividend-paying sectors. In contrast, the healthcare equipment & services and support services sectors are considered as low dividend-paying sectors.

The average payout ratio of the chemicals sector is found to be 44.78%. This is consistent with findings of McDonald et al. (1975) and Lintner (1975). The average EPS and DPS of the chemicals sector is higher than its market average. Regardless of the severe financial crisis conditions in 2007-2008, the companies have increased the dividends to build confidence on shareholders in 2007 and 2009. Besides, the analyses result of food & drug retailers sector is consistent with chemicals sector with regard to payout ratios. In addition, the average payout ratio of food & drug retailers sector is found to be 45.81%, which is quite close to the chemicals sectors average payout ratio of 44.78%. If these regression models are postulated as significant, the speed of adjustment coefficient of the chemicals sector is higher food & drug retailer sector. It is evident that dividend of the chemicals sector fluctuates more than the food & drug

³³ See the table 2 for the exact figures.

retailers sector as a result of higher reaction coefficient. However, these sectors regression model's coefficients are statistically insignificant. Perhaps, the sample size is not enough and/or specifically these companies consider other factor to determine their dividend policy.

The healthcare equipment & services sector's average payout ratio is found as 23.43%, which is quite consistent with the same sector payout ratio (25.38%) in DAX30 index. Both sectors have, on average, paid lower dividend per shares and received lower earnings per share in comparison with its market averages. The regression analysis results showed that the reaction coefficient of healthcare equipment & services sector in France is greater than same sector in Germany. Thus, it can be said that the managers react more rapidly to the fluctuation of earnings per share in France. Also, in France the intercept is negative and it shows that managers are more willing to take risk of severe earnings decline by reducing the dividends. Notably, applying the different target payout ratio investigation showed that, the higher target payout ratio produces lower speed of adjustment coefficient; perhaps, managers are more reluctant to frequent dividend adjustment in the case of higher target payout ratio.

The lower dividend payment has corresponded with the lower earnings in support services sector as other sectors that are investigated as lower dividend-paying sectors showed in case of Germany and France. The analyses of support services sector showed that, when managers reduced the dividends, they experienced the sharp decline on corporate earnings and the period of 2007-08 and 2010-11 can be considered as a supportive case for this argument. However, the partial adjustment model is found statistically insignificant, under the all three target payout ratio assumptions as similar to two high dividend-paying sector in SBF120 index.

Finally, when all findings are taken into account, there are three main findings can be summarised within three aspects. First, despite of the severe financial crisis factors, majority of managers are reluctant to reduce of cut dividends. Second, the higher the target payout ratio the lower the speed of dividend adjustment is and, lastly, on the contrary to the low dividend-paying sectors, high dividend-paying sectors have experienced higher earnings per share, on average, between 1995 and 2014.

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Appendix

Figure 1: Yearly market return fluctuation of SBF120

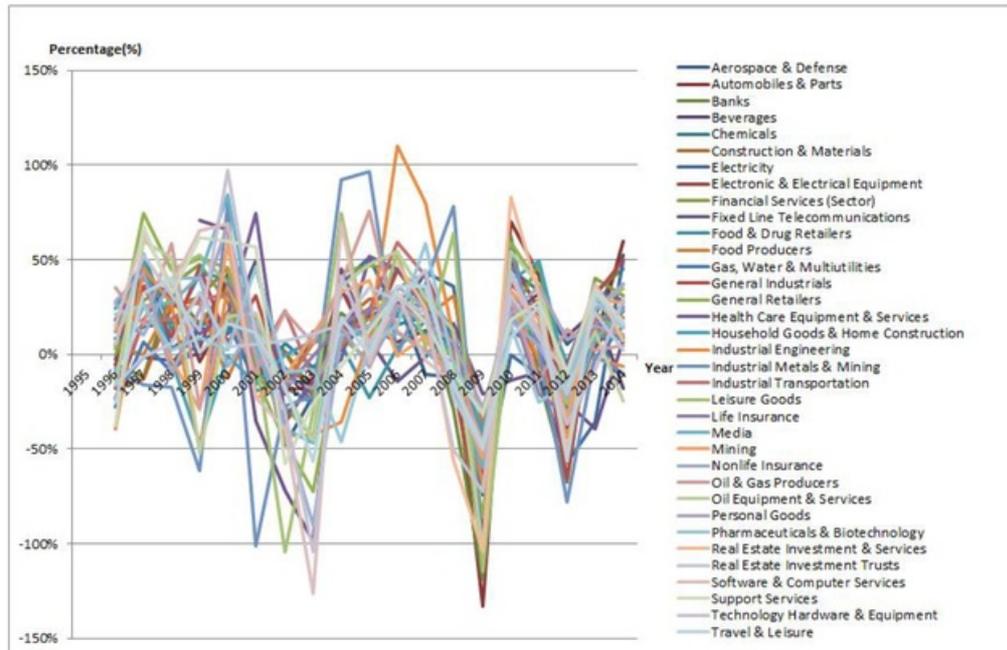


Table 1: Sectoral Dividend Payment in France(SBF120)

Sectors	Average DPS (1995-2014)	
General Retailers	€	2.30
Real Estate Investment Trusts	€	2.11
Nonlife Insurance	€	1.51
Real Estate Investment & Services	€	1.36
Chemicals	€	1.30
Food & Drug Retailers	€	1.18
Industrial Engineering	€	1.12
Industrial Metals & Mining	€	1.12
Financial Services (Sector)	€	1.08
Mining	€	1.04
Personal Goods	€	1.02
Household Goods & Home Construction	€	1.00
Construction & Materials	€	0.96
Food Producers	€	0.93
Beverages	€	0.93
Fixed Line Telecommunications	€	0.87
Banks	€	0.84
Oil & Gas Producers	€	0.74
Electricity	€	0.70
Gas, Water & Multiutilities	€	0.70
Travel & Leisure	€	0.68
Automobiles & Parts	€	0.67
General Industrials	€	0.66
Pharmaceuticals & Biotechnology	€	0.63
Electronic & Electrical Equipment	€	0.59
Industrial Transportation	€	0.56
Life Insurance	€	0.49
Technology Hardware & Equipment	€	0.45
Media	€	0.41
Oil Equipment & Services	€	0.40
Aerospace & Defense	€	0.34
Software & Computer Services	€	0.27
Health Care Equipment & Services	€	0.26
Support Services	€	0.22
Leisure Goods	€	-

(Source: Datastream)

Table 5: DAX30 Regression Analysis, under the 50% of Payout Ratio Assumption

<i>Regression Statistics</i>	
Multiple R	0.8343
R Square	0.6960
Adjusted R Square	0.6782
Standard Error	0.0988
Observations	19

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.37963	0.37963	38.92787	8.984E-06
Residual	17	0.16579	0.00975		
Total	18	0.54542			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	-0.0746	0.0301	-2.4803	0.0239
X2	0.2877	0.0461	6.2392	8.984E-06

Table 6: Regression Analysis of Automobile & Parts Sector, under the 25% Target Payout Ratio Assumption

<i>Regression Statistics</i>	
Multiple R	0.798236975
R Square	0.637182268
Adjusted R Square	0.615840048
Standard Error	0.266748382
Observations	19

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	2.124357902	2.124358	29.85548	4.20061E-05
Residual	17	1.209629891	0.071155		
Total	18	3.333987792			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	0.037226657	0.063493027	0.586311	0.565371
C	0.326288602	0.059715882	5.464017	4.2E-05

Table 9: Historical DPS table of Siemens and ThyssenKrupp AG

Year	SIEMENS - DIV.PER SHR.		THYSSENKRUPP - DIV.PER SHR.	
1995	€	0.43	€	0.31
1996	€	0.43	€	0.31
1997	€	0.43	€	0.51
1998	€	0.50	€	0.41
1999	€	0.50	€	0.72
2000	€	0.50	€	0.72
2001	€	0.65	€	0.72
2002	€	0.97	€	0.72
2003	€	0.97	€	0.60
2004	€	1.07	€	0.50
2005	€	1.21	€	0.60
2006	€	1.31	€	0.70
2007	€	1.41	€	1.00
2008	€	1.55	€	1.30
2009	€	1.55	€	1.30
2010	€	1.55	€	1.30
2011	€	2.62	€	0.45
2012	€	2.91	€	0.45
2013	€	2.91	€	-
2014	€	3.00	€	-
AVERAGE	€	1.32	€	0.63

(Source: Datastream)

Table 10: Historical EPS table of Siemens and ThyssenKrupp AG

Year	SIEMENS - EARNINGS PER SHR	THYSSENKRUPP - EARNINGS PER SHR
1995	1.05	1.23
1996	1.09	0.11
1997	1.64	0.04
1998	1.38	0.24
1999	1.33	0.24
2000	1.75	0.23
2001	8.29	1.02
2002	2.29	1.02
2003	2.83	1.08
2004	2.63	1.04
2005	3.7	1.63
2006	3.32	1.17
2007	3.36	3.24
2008	4	4.3
2009	1.85	4.59
2010	2.57	0
2011	4.35	1.77
2012	6.82	0
2013	4.93	0
2014	5.08	0
AVERAGE	3.213	1.1475

(Source: Datastream)

Table 11: The list of ThyssenKrupp's DPS, EPS and Payout Ratios, Between 1995 and 2014

Year	DPS	EPS	PAYOUT RATIO
1995	€ 0.31	€ 1.23	25%
1996	€ 0.31	€ 0.11	282%
1997	€ 0.51	€ 0.04	1275%
1998	€ 0.41	€ 0.24	171%
1999	€ 0.72	€ 0.24	300%
2000	€ 0.72	€ 0.23	313%
2001	€ 0.72	€ 1.02	71%
2002	€ 0.72	€ 1.02	71%
2003	€ 0.60	€ 1.08	56%
2004	€ 0.50	€ 1.04	48%
2005	€ 0.60	€ 1.63	37%
2006	€ 0.70	€ 1.17	60%
2007	€ 1.00	€ 3.24	31%
2008	€ 1.30	€ 4.30	30%
2009	€ 1.30	€ 4.59	28%
2010	€ 1.30	€ -	0%
2011	€ 0.45	€ 1.77	25%
2012	€ 0.45	€ -	0%
2013	€ -	€ -	0%
2014	€ -	€ -	0%

(Source: Datastream)

Table 13: Regression Analysis of General Industrials Sector, under the 25% of Target Payout Ratio Assumption

<i>Regression Statistics</i>					
Multiple R		0.445358827			
R Square		0.198344485			
Adjusted R Square		0.151188278			
Standard Error		0.097222495			
Observations		19			

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.039757108	0.039757	4.206116	0.056020047
Residual	17	0.160687629	0.009452		
Total	18	0.200444737			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	0.108258534	0.032608564	3.319942	0.004052
C	0.124773637	0.060839019	2.050882	0.05602

Table 14: Regression Analysis of General Industrials Sector, under the 75% of Target Payout Ratio Assumption

<i>Regression Statistics</i>					
Multiple R		0.450348619			
R Square		0.202813879			
Adjusted R Square		0.155920578			
Standard Error		0.096951098			
Observations		19			

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.040652975	0.040653	4.325007	0.053002012
Residual	17	0.159791762	0.0094		
Total	18	0.200444737			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	0.01437851	0.031062859	0.462884	0.649318
C	0.062070691	0.029846482	2.079665	0.053002

Table 16: Regression Analysis of Software & Computer Services Sector, under the 25% Target Payout ratio Assumption.

<i>Regression Statistics</i>					
Multiple R		0.339970364			
R Square		0.115579848			
Adjusted R Square		0.063555134			
Standard Error		0.043541821			
Observations		19			

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.004211973	0.004212	2.221633	0.154409884
Residual	17	0.032230132	0.001896		
Total	18	0.036442105			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	0.043684211	0.009989179	4.373153	0.000414
C	0.236960507	0.158979001	1.490515	0.15441

Table 17: Regression Analysis of Software and Computer Services Sector, under the 50% Target Payout ratio Assumption

<i>Regression Statistics</i>					
Multiple R		0.807597031			
R Square		0.652212964			
Adjusted R Square		0.631754903			
Standard Error		0.027304483			
Observations		19			

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.023768013	0.023768	31.88049	2.90266E-05
Residual	17	0.012674092	0.000746		
Total	18	0.036442105			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	0.003939666	0.010506209	-0.37498	0.712309
C	0.17569974	0.031117782	5.646281	2.9E-05

Table 22: Regression Analysis of SBF120, under the 50% of Payout Ratio Assumption

<i>Regression Statistics</i>	
Multiple R	0.8672
R Square	0.7521
Adjusted R Square	0.7375
Standard Error	0.0557
Observations	19

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.1601	0.1601	51.5801	1.5348E-06
Residual	17	0.0528	0.0031		
Total	18	0.2129			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	-0.0240	0.0165	-1.4593	0.16271363
C	0.2117	0.0295	7.1819	1.5348E-06

Table 23: Regression Analysis of SBF120, under the 75% of Payout Ratio Assumption

<i>Regression Statistics</i>	
Multiple R	0.8277
R Square	0.6851
Adjusted R Square	0.6666
Standard Error	0.0628
Observations	19

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.1459	0.1459	36.9867	1.22134E-05
Residual	17	0.0670	0.0039		
Total	18	0.2129			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	-0.0746	0.0251	-2.9714	0.008560844
C	0.1344	0.0221	6.0817	1.22134E-05

Table 24: Regression Analysis of the Chemicals Sector with 25% of Target Payout Ratio Assumption

<i>Regression Statistics</i>	
Multiple R	0.3137
R Square	0.0984
Adjusted R Square	0.0454
Standard Error	0.2382
Observations	19

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.1053	0.1053	1.8555	0.1909
Residual	17	0.9643	0.0567		
Total	18	1.0696			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	0.1851	0.0995	1.8604	0.0802
C	0.3099	0.2275	1.3622	0.1909

Table 25: Regression Analysis of the Chemicals Sector with 50% of Target Payout Ratio Assumption

<i>Regression Statistics</i>	
Multiple R	0.2483
R Square	0.0616
Adjusted R Square	0.0064
Standard Error	0.2430
Observations	19

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.0659	0.0659	1.1168	0.3054
Residual	17	1.0036	0.0590		
Total	18	1.0696			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	-0.0063	0.0926	-0.0676	0.9469
C	0.1493	0.1413	1.0568	0.3054

Table 26: Regression Analysis of the Chemicals Sector with 75% of Target Payout Ratio Assumption

<i>Regression Statistics</i>	
Multiple R	0.2003
R Square	0.0401
Adjusted R Square	-0.0164
Standard Error	0.2457
Observations	19

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.0429	0.0429	0.7103	0.4111
Residual	17	1.0267	0.0604		
Total	18	1.0696			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	-0.0396	0.1437	-0.2755	0.7863
C	0.0790	0.0937	0.8428	0.4111

Table 27: Regression Analysis of the Food & Drug Retailers Sector with 25% of Target Payout Ratio Assumption

<i>Regression Statistics</i>	
Multiple R	0.2149
R Square	0.0462
Adjusted R Square	-0.0099
Standard Error	0.1032
Observations	19

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.0088	0.0088	0.8231	0.3770
Residual	17	0.1811	0.0107		
Total	18	0.1899			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	0.0961	0.0368	2.6115	0.0182
DIFF3	0.0532	0.0587	0.9073	0.3770

Table 28: Regression Analysis of the Food & Drug Retailers Sector with 50% of Target Payout Ratio Assumption

<i>Regression Statistics</i>	
Multiple R	0.1223
R Square	0.0150
Adjusted R Square	-0.0430
Standard Error	0.1049
Observations	19

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.0028	0.0028	0.2581	0.6180
Residual	17	0.1871	0.0110		
Total	18	0.1899			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	0.0669	0.0251	2.6617	0.0164
DIFF2	0.0193	0.0379	0.5080	0.6180

Table 29: Regression Analysis of the Food & Drug Retailers Sector with 75% of Target Payout Ratio Assumption

<i>Regression Statistics</i>	
Multiple R	0.0702
R Square	0.0049
Adjusted R Square	-0.0536
Standard Error	0.1054
Observations	19

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.0009	0.0009	0.0843	0.7751
Residual	17	0.1890	0.0111		
Total	18	0.1899			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	0.0643	0.0322	1.9955	0.0623
DIFF4	0.0072	0.0248	0.2903	0.7751

Table 33: Regression Analysis of the Service Sector with 25% of Target Payout Ratio Assumption

<i>Regression Statistics</i>	
Multiple R	0.2207
R Square	0.0487
Adjusted R Square	-0.0073
Standard Error	0.0835
Observations	19

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.0061	0.0061	0.8702	0.3640
Residual	17	0.1186	0.0070		
Total	18	0.1246			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	0.0334	0.0192	1.7391	0.1001
C	0.1883	0.2019	0.9328	0.3640

Table 34: Regression Analysis of the Service Sector with 50% of Target Payout Ratio Assumption

<i>Regression Statistics</i>	
Multiple R	0.2901
R Square	0.0842
Adjusted R Square	0.0303
Standard Error	0.0819
Observations	19

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.0105	0.0105	1.5626	0.2282
Residual	17	0.1141	0.0067		
Total	18	0.1246			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	0.0088	0.0266	0.3303	0.7452
C	0.1260	0.1008	1.2501	0.2282

Table 35: Regression Analysis of the Service Sector with 75% of Target Payout Ratio Assumption

<i>Regression Statistics</i>	
Multiple R	0.2899
R Square	0.0841
Adjusted R Square	0.0302
Standard Error	0.0819
Observations	19

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.0105	0.0105	1.5600	0.2286
Residual	17	0.1142	0.0067		
Total	18	0.1246			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	0.0027	0.0302	0.0904	0.9291
C	0.0780	0.0624	1.2490	0.2286

Table 36: Solvay SA's Historical Dividend Payments, yearly.

ICB SECTOR NAME	Chemicals
Name	SOLVAY - EARNINGS PER SHR
1995	0
1996	2.39
1997	3.65
1998	3.93
1999	3.94
2000	4.45
2001	5.08
2002	5.27
2003	5.53
2004	5.53
2005	6.08
2006	3.93
2007	7.83
2008	9.1
2009	6.59
2010	4.34
2011	3.23
2012	3.31
2013	4.6
2014	5.56

(Source: Datastream)