The long-run evolution of dividend policy: Evidence from Belgium 1838-2012

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Abstract

We investigate the evolution of the dividend policy of listed Belgian firms. We use the unique database of the Studiecentrum voor Onderneming en Beurs at the University of Antwerp, which includes data on all firms listed on the Brussels Stock Exchange (BSE) between 1838 and 2012. In this period of time, the institutional environment in Belgium changed considerably: Investor protection was almost absent before World War I and improved gradually over time. Taxation legislation also changed substantially: before World War I, dividends were not subject to taxes, whereas a dividend taxation was introduced in 1920. Given the general belief that the institutional environments affects the dividend policy, we expect to find that the dividend policy of listed Belgian firms changed over time. Using structural break analysis (Bai & Perron, 1998, 2003), we show that the dividend policy of listed Belgian firms is remarkably stable over time. Taking into account firm characteristics, we are neither able to find a clear relationship between dividend policy and agency conflicts or information asymmetry. We are thus the first to show that a changing institutional environment and changing taxation legislation almost have no impact on the dividend policy.

Keywords: Belgium, Brussels Stock Exchange (BSE), Dividend policy, Financial history

1. Introduction

More than five decades after Miller & Modigliani (1961), researchers still try to find an answer to the question why firms pay dividends. Different explanations are put forward, such as agency conflicts between managers and shareholders (e.g. free-cash flow hypothesis (Jensen, 1986)), information asymmetry between insiders and outsiders (e.g. signaling theory (Bhattacharya, 1979)) and taxation. In the literature, evidence is found in favor of the different dividend-theories. For example, while Braggion & Moore (2011) find strong support for the asymmetric information theory in Britain (1895-1905), La Porta, Lopez-de-silanes, Shleifer, & Vishny (2000) find evidence consistent with the agency theory as they show that firms in countries with better legal protection of minority shareholders pay more dividends. Dhaliwal, Erickson, & Trezevant (1999) find dividend clienteles have an important impact on the firm's dividend policy. The question of why firms pay dividends remains thus unresolved.

In this paper, we investigate whether and, if so, how dividend policy of listed Belgian firms has changed between 1838 and 2012. In this period, the prevalence and severity of the already mentioned market frictions has changed quite drastically. Whereas information asymmetry and agency conflicts are expected to be normal in the pre-War period, investor protection gradually improves over the years (Théate, 1905). The third common market friction, taxation, is of no matter in the pre-War period, as dividend taxation is only introduced in 1920 (Gilson, 1921). Changes in corporate and tax legislation clearly affect the importance of these market frictions. As the legislation has changed quite a lot over the years (for instance introduction of publication requirements (1841), introduction of dividend taxation (1920)), we expect dividend policy also to change drastically over time.

Our research is based on a unique, high-quality database of the Studiecentrum voor Onderneming en Beurs (SCOB) at the University of Antwerp. This database contains information on every single stock ever listed on the Brussels Stock Exchange (BSE) since

1838. Data are available for end-of-month stock prices, dividends, ex-dividend day, number of stocks and capital operations (for instance (reverse) stock splits, bonus stocks, subscription rights and attribution rights) (Annaert, Buelens, & De Ceuster, 2012).

In order to answer the question whether dividend policy changes over the period considered, we perform structural break tests (Bai & Perron, 1998, 2003). We only find three structural breaks in the data: at the start of World War I, at the end of World War II and in the mid-1980s. We show that the first two breaks are caused by the effect of both World Wars, whereas the third break is explained by changing characteristics of the firms listed on the BSE. The changing prevalence and severity of agency conflicts, information asymmetry and taxation have thus only a limited impact on dividend policy. Since the amount of agency conflicts and information asymmetry to which a firm is exposed is not only determined by the institutional environment, but is also likely to be determined by firm characteristics, we estimate additional regression models in which we link firm age and firm size to dividend policy. Again, we do not find consistent evidence in favor of the agency conflict explanation nor in favor of the information asymmetry explanation. We are thus the first to show that agency conflicts, information asymmetry and taxation only have a minor impact on dividend policy. The contribution of this paper is threefold. We are the first to investigate dividend policy over a period of 175 years. Other papers investigating dividends in historical context only consider a short time-frame (e.g. Braggion & Moore, 2011; Campbell & Turner, 2011; Deloof, Roggeman, & Van Overfelt, 2010; Turner, Ye, & Zhan, 2013). Moreover, the institutional environment in which firms operate, changes drastically in the period considered. This enables us to link dividend policy to the environment. Finally, this research is unique, as our data is simply not available for any other country in the world over such a long period of time. Moreover, Belgium is historically very interesting to investigate, as it was one of the leading countries in the pre-War era: it was the first country on the European continent to

industrialize and the BSE belonged to the largest stock exchanges at the eve of the 20th century.

The remainder of this paper is organized as follows. In section 2 we discuss the relation between the institutional environment and dividend policy. Section 3 focusses on the data and methodology. In section 4 the results are discussed and the final section concludes.

2. The changing institutional environment in Belgium

The institutional environment in which listed Belgian firms operate, changed quite drastically over the period between 1838 and 2012. In the beginning of the period, Belgium was characterized by low investor protection (Théate, 1905) and the absence of dividend taxation (Gilson, 1921). After the independence of Belgium, the Commercial Code, as introduced by Napoleon in 1807, was still in force. This Code imposed little legislation: companies were not obliged to publish a balance sheet or profit and loss account, there was no regulation on how to value assets and regulation on the distribution of profits was also absent. In contrast, incorporation requirements were rather strict, as incorporation required permission by the government (Piret, 1946, pp. 22–23). In this environment of weak investor protection, information asymmetry and agency conflicts are expected to be very important. By changing corporate legislation, investor protection improved gradually over time. Regulation concerning publication requirements, for instance, was subject to some improvements: from 1841, companies were legally obliged to publish at least once a year a balance sheet and a profit and loss account (Demeur, 1859, pp. CVII–CXIV). In 1881, sanctions were imposed on managers of companies publishing fraudulent financial statements (Piret, 1946, pp. 41–45, 57–59). In 1913, the content of the balance sheet was for the first time legally determined: the asset side was subdivided in fixed assets and current assets, the liability side was subdivided in share capital and liabilities (Resteau, 1913, pp. XIII, XL–XLII). In 1975, the content of the balance sheet was further specified, subdividing the asset side and liability side in more

detailed categories (Kredietbank, 1977). As regards the distribution of profits, regulation was also subject to major reforms: after Belgian independency, there was no limitation on profit distribution. Moreover, companies often paid a 5% interest on share capital on top of the yearly dividend. Doing so, shareholders were guaranteed a return at least equal to the return on government debt. This interest was paid whether or not sufficient profits were available, thereby possibly eroding the authorized capital (De Clercq, 1992, pp. 158–159). In 1841, this interest on shares was abolished. Moreover, from that moment onwards, companies were allowed to pay a dividend only out of the "real profit". The law, however, did not determine how to calculate this "real profit" (Demeur, 1859, pp. CVII–CXIV). In 1873, a fine or even an imprisonment was imposed on managers of companies paying too high a dividend (Guillery, 1874, vol. 3 pp. 162-163, 447-456). Finally, in 1985, after more than 140 years after the 1841-law, the legislator determined a legal definition of "distributable profit" (Tas, 2003, pp. 67–76, 164). Next to information asymmetry and agency conflicts, the third explanation of why firms pay dividends, i.e. taxes, might play an important role in Belgium after World War I. In 1920, the Belgian taxation system was completely reformed, and dividend taxation was introduced. The taxation system is from the beginning on characterized by high complexity and high instability, as it changed many times. As we do not intend to fully describe the Belgian taxation system nor its evolution, we focus on the taxation of dividends. Dividends have been taxed both directly and indirectly. The direct dividend taxation rate was initially set at 10% and changed eleven times since 1920. Indirectly, dividends are also taxed as part of the company profit and/or as part of the global income of the taxpayer (Gilson, 1921). Table 1 shows a brief overview of the evolution of the dividend taxation system in Belgium.

*** Insert Table 1 here ***

Due to immense changes in the institutional environment in which listed Belgian firms operate, the prevalence and importance of the different market frictions, i.e. agency conflicts,

information asymmetry and taxation, changed over the years. Given the clear relationship between these market frictions and dividend policy, we expect dividend policy to change likewise.

3. Data & methodology

3.1 Data

This research is based on the unique, high-quality database at the Studiecentrum voor Onderneming en Beurs (SCOB) at the University of Antwerp. The database contains information on every single stock ever listed on the BSE. End-of-month stock prices, number of stocks, dividend information (dividend paid, ex-dividend day) and capital operations (stock dividends and stock splits) are available for each stock. The data are highly reliable, being hand-collected and cross-checked using different sources. The Official Quotation List of the BSE, the Official Journal, the Moniteur des Intérêts Matériels and the Commission des Agents de Change (between 1835 and 1855) are the main sources from which data are collected (Annaert et al., 2012). This research is thus unique as Belgium is the only country in the world with such detailed and reliable database over such a long period of time.

Using this database, we collect data on 1,885 unique common stocks listed on the BSE since 1838. Only Belgian firms listed on the spot market are considered. Figure 1 shows the evolution of the number of stocks listed on the BSE between 1838 and 2012. Firms are subdivided into three categories based on their age (number of years since their IPO).

*** Insert Figure 1 here ***

3.2 Dividend measures

Dividend policy is measured in different ways. First, we calculate dividend yield. The firm-level dividend yield is calculated for each stock at the end of each year as:

$$DY_{i,t} = \frac{D_{i,t}+D_{i,t-1}+\cdots D_{i,t-11}}{P_{i,t-12}}$$, where D = dividend and P = stock price.

Next to this firm-level dividend yield, we calculate the economy-wide dividend yield as a weighted average of these individual dividend yields, based on market capitalization of firms. Second, we calculate the propensity to pay, which measures the percentage of firms paying a dividend in year t. Third, we subdivide firms based on how the nominal dividend per share changes compared to the previous year. We measure the propensity to increase as the number of firms having a higher nominal dividend per share in year t compared to year t-1 divided by the total number of firms. This variable includes thus also firms initiating a dividend. The propensity to maintain a stable dividend (propensity towards stability) is calculated as the ratio of all firms having exactly the same nominal dividend in year t as in year t-1 to the total number of firms. Finally, we calculate the propensity to decrease, not to pay (propensity to decrease from now on), which includes firms decreasing or omitting their dividend and firms who do not distribute a dividend in at least two successive years[1].

3.3 Methodology

To test whether dividend policy of Belgian firms has changed significantly, we perform structural break tests as discussed by Bai & Perron (1998, 2003). This method is particularly useful as it allows us to search for multiple structural changes in our data at unknown points in time. A structural break is found whenever the average level of the variable is significantly different in the period before the break compared to the average level of the variable after the break. The test consists of two parts. In first instance, different types of test are conducted in order to test whether structural breaks are present in the data. If the null hypothesis is rejected, the number of breaks and their location are determined in the second part of the analysis. We perform this analysis for the value-weighted dividend yield, the propensity to pay and for the

[1] We also calculated the propensities to change based upon the number of firms paying a dividend in a given year rather than the total number of listed firms. The analyses are also done for these propensities, and the results remain the same.

three propensities to change. Next to this, we also link dividend policy to some firm characteristics in regression analysis. In the next section, we discuss the results.

4. Results

4.1 The evolution of dividend policy

Using descriptive statistics, we describe the evolution of the dividend policy of listed Belgian firms in Table 2. The statistics are shown as well for the entire period from 1838 to 2012 as for different subperiods. During World War I and World War II, dividend policy was legally restricted. Therefore, we subdivide the period of 175 years into 5 different subperiods (1838-1913, 1914-1918 (World War I), 1919-1939, 1940-1945 (World War II) and 1946-2012). In Figure 2 and Table 2 (Panel A), the evolution of the value-weighted dividend yield is shown. Over the whole period, dividend yield was on average 3.67%. Dividend yield was the highest in the pre-war period (4.23% on average) and dropped clearly during World War I and World War II (1.69% and 1.64% respectively). During the Interbellum, dividend yield was on average 3.47%, which is very comparable to the average post-war dividend yield (3.41%). In Panel B, the descriptive statistics for equally-weighted (firm-level) dividend yields are shown. The evolution is the same as for the value-weighted dividend yield. However, the average equally-weighted dividend yield is lower in most periods, showing that larger firms – which have higher weights in the value-weighted dividend yield – tend to have higher dividend yields. The evolution of propensity to pay (Figure 3 and Table 2Table 2, Panel C) is very similar to the evolution of dividend yield. Over the entire period, on average 59.85% of listed Belgian firms paid a dividend. Before World War I and after World War II, the average was very comparable, amounting to 62.78% and 63.51% respectively. During World War I and World War II, the number of payers dropped to 26.56% and 44.82% respectively. Between both world wars, on average 49.79% of the firms paid a dividend. The evolution of the three propensities to change is shown in Figure 4 and Panel D to F (Table 2). Over the whole

period, on average 31.73% of listed Belgian firms increased its dividend, 15.39% maintained a stable dividend and about half of the firms decreased, omitted to or did not pay a dividend. Before World War I, on average 28.68% increased its dividend, 18.99% had a stable dividend and 52.34% decreased its dividend or did not pay one. Comparing this to the post-war period, the propensities were 39.18%, 14.28% and 46.54% respectively, showing a minor move from stable dividends and decreasing dividends towards more dividend increases. During and between both wars, the propensity to increase and the propensity towards stability dropped, whereas more firms decreased or did not pay a dividend. As shown in Figure 4, the propensity to increase was quite low in 1976. This drop was caused by the introduction of a legislation imposing restrictions on the amount of dividend paid during one year. In 1976, dividends were not allowed to be higher than the maximum dividend of 1972, 1973 or 1974 (Nationale Bank van België, 1976, pp. 26–27).

*** Insert Table 2 here ***

*** Insert Figure 2 here ***

*** Insert Figure 3 here ***

*** Insert Figure 4 here ***

4.2 Did dividend policy change over the years?

In the previous section, we showed that dividend policy was clearly affected by World War I and World War II, but the differences in dividend policy before World War I and after World War II were rather limited. In this section, we discuss the results of the structural break analysis. Appendix A describes the structural break analysis in more detail and contains the outputs of the analysis. In Table 3, the results of the structural break analysis are summarized: Panel A reports the number of breaks and the break dates for each variable, Panel B shows the average value of each variable in the different periods as found by the structural break analysis.

For value-weighted dividend yield, three breaks are found: in 1914, in 1947 and in 1986. In the first (1838-1913) and third period (1947-1985), dividend yield was fairly high (4.22% and 4.04% respectively). During and between both wars, dividend yield dropped to 2.77%. In the most recent period (1986-2012), dividend yield was even lower (2.67%). For propensity to pay, no breaks are found, showing that propensity to pay remained unchanged. On average, 59.78% (Table 2) of the firms paid a dividend in a given year. The propensity to increase did change once, in 1979. Before the break, on average 28.89% of the firms increased its dividend, whereas after 1979, 43.94% of the firms increased the dividend payment. For the propensity towards stability, three breaks are found: in 1914, in 1948 and in 1986. The propensity towards stability was fairly high in the first period (1838-1913), as 19.02% of the firms had a stable dividend. It decreased drastically during and between both world wars (8.63%). In the third period, 17.71% of the firms had a stable dividend and after 1986 this percentage dropped to 10.12%. Finally, we found two structural breaks for the propensity to decrease: in 1913 and in 1945. The propensity to decrease was the highest in the War-period (67.44%), whereas it was only 52.34% before World War I and 46.54% after World War II.

*** Insert Table 3 here ***

Based on this results, we can conclude that there are three structural breaks in the data: at the start of World War I, at the end of World War II and in the mid-1980s. We can thus subdivide the period of 175 years into four different subperiods: the pre-war period (1838-1913), the war-period (1914-1945), the early post-war period (1946-1985) and the late post-war period (1986-2012). Surprisingly, the breaks do not coincide with the changes in the Belgian Commercial Code nor with changes in the taxation legislation. So apparently, the link between the institutional environment and dividend policy is very weak in Belgium. In the next sections, we will explain what are the driving forces behind the breaks in the data.

4.3 The impact of World War I and World War II on dividend policy

As both world wars had severe consequences for Belgium, we removed the War years (1914-1918, 1940-1945) from our analysis. We again executed the structural break analysis for dividend yield, propensity to pay, propensity to increase, propensity to maintain a stable dividend and propensity to decrease, not to pay. Results are summarized in Table 4; The entire outputs of the structural break analysis are reported in Appendix-Table 2.

For dividend yield, one structural break is found in 1986. Before 1986, dividend yield was quite high (4.03%), and afterwards, it dropped to 2.67%. Dividend yield during World War I and World War II was thus exceptionally low and drove the results in the first analysis. Consistent with the first analysis, we did not find a break for the propensity to pay. For propensity to increase, evidence is found in favour of the presence of one structural break, which is found in 1979. Again, the propensity to increase was lower in the period before 1979 (29.94%) than after 1979 (43.94%). Comparing these results with the results of previous analysis shows that the propensity before 1979 was slightly higher than in the first tests (28.89%) showing that the propensity to increase decreased slightly during both world wars. For the propensity towards stability, again three structural breaks are found: in 1913, in 1951 and in 1987. These breaks correspond to the breaks in the original analysis. In the first period, the propensity amounted to 18.99%. In the period between both Wars, the propensity towards stability was estimated to be 9.58%, which is higher than the propensity if both wars are included (8.63%). In the early post-war period, the propensity increased again to 17.99% and decreased after 1987 to 9.90%. Finally, for propensity to decrease, not to pay, one break was found in 1947. Before 1947, the propensity to decrease, not to pay was 54.79%, whereas after World War II, only 46.26% of the firms decreased its dividend or did not pay a dividend. The absence of a break at the start of World War I shows that exceptionally many firms had a lower dividend or even no dividend during both world wars.

As the majority of the breaks at the start of World War I and at the end of World War II, disappear we conclude that the results of the original structural break analysis are driven by the world wars. Despite the large differences in the institutional environment before World War I and after World War II, dividend policy is quite similar.

4.4 Dividend policy of mature firms versus young firms

Next to the breaks at the start of World War I and at the end of World War II, a break is also found in the mid-1980s. In this period, the BSE attracts many newly listed, young firms, whereas, mature firms disappear from the stock exchange at an increasing pace (Figure 1). Evidence is found that the dividend policy of mature firms and young firms differ: whereas young firms have ample investment opportunities, mature firms are mostly cash-generating machines and are thus better able to distribute dividends (DeAngelo, DeAngelo, & Stulz, 2006). We investigate whether the change in the prevalence of firm characteristics can explain the break in dividend policy in the mid-1980s. Therefore, we consider only a sample of long-lived firms. In order to be included in this selected sample, firms should be listed for more than 10 years.[2] For these firms, we recalculated the propensity to pay, the propensity to increase, the propensity to maintain a stable dividend and the propensity to decrease, not to pay. Results are summarized in Table 5; The entire output is included in Appendix-Table 3.

For propensity to pay, we found two breaks: in 1913 and in 1946. The propensity to pay was high before World War I (72.08%) and after World War II (65.41%) but dropped during and between both wars (only 46.94%). For propensity to increase , we found one break in 1979. Again, after 1979 about 44% of the firms increased its dividend whereas before 1979 only 30% did so. For propensity to maintain a stable dividend and for the propensity to decrease, not to pay, we found a break at the start of World War I and at the end of World War II. The break halfway the eighties thus disappeared. The propensity to maintain a stable dividend was

[2] A second analysis considers only firms that are listed more than 20 years. The results remain the same.

the highest before World War I (23.88%). During and between both world wars, this number dropped to 8.93%, and after World War II, again more firms maintained a stable dividend (15.87%). For propensity to decrease, not to pay, there is almost no difference between the propensity before World War I (47.02%) and after World War II (45.28%). During and between both world wars, mature firms tended to decrease their dividend or even did not pay a dividend at all, as the propensity increases to 65.49%.[3]

Except for propensity to increase, we did not find a break anymore in the mid-1980s, showing that dividend policy of mature firms did not change significantly at that point in time. The change in the type of firms listed at the stock exchange (young vs. mature firms) is thus a reason for the changing dividend policy in the mid-1980s.

4.5 The role of inflation

Until now, we have considered only changes in the nominal dividend of listed Belgian firms. In this section, we take into account inflation and we investigate how the real propensity to increase (not taking into account firms initiating a dividend) and the real propensity to cut (not taking into account firms omitting or not paying a dividend) evolves. Doing this analysis, we can investigate whether changing inflation affects dividend policy. Throughout the years, inflation changed considerably in Belgium: whereas inflation was on average very low, but highly volatile, in the pre-World War I Belgium, it was quite high during and between both world wars. In the early post-war period, inflation was on average 5.17% and still highly volatile, whereas the average inflation (and its volatility) dropped drastically in the late-post war period. Table 6 reports the descriptive statistics concerning inflation.

*** Insert Table 6 here ***

[3] If we drop the War-years out of the analysis, we again find no structural breaks for propensity to pay, which means that the breaks in propensity to pay are driven by the low number of payers during World War I and World War II. For propensity to increase, there is a break in 1981. For propensity to maintain a stable dividend, we find a break in 1913 and 1948. For propensity to decrease, not to pay, we find only one break in 1982.

Data are gathered from different sources: Michotte (1937) calculated the consumer price index [4] in the pre-World War I period. During World War I, we use data of Scholliers (1978). From 1920 to 2012, we use data from the Belgian government (FOD Economie, KMO, Middenstand & Energie, 2014). The Belgian government did not calculate a CPI during World War II, however. For this period, we use data of Deweirdt, Van Poeck, & Annaert (1997, p. 166).

We repeat the structural break analysis for real propensity to increase and real propensity to cut. The summary of the results is reported in Table 7, the entire output is shown in Appendix-Table 4. For propensity to increase, we find two breaks: in 1914 and in 1949. Before World War I, on average 30.16% of the firms increases their real dividend, whereas during and between both world wars the propensity drops to 19.22%. After World War II, the propensity to increases rises again to 39.29%, which is slightly higher than the pre-war level. For propensity to decrease, we also find two breaks, but at different time points, namely in 1896 and in 1986. In the first period, on average 26.53% of the firms cuts its real dividend. Between 1896 and 1985, on average 19.59% of firms decreases the dividend, whereas in the most recent period, from 1986 onwards, on average only 13.48% of the firms decreases its real dividend.

4.6 Firm maturity and dividend policy

Notwithstanding the major changes in the institutional environment, we showed dividend policy to be fairly stable over time. The impact of the changing prevalence and severity of agency conflicts, information asymmetry and taxation on dividend policy seems thus to be limited. The structural break analysis, however, does not take into account firm characteristics, which are likely to influence the amount of agency conflicts and information asymmetry to which a firm is exposed. On the one hand, Lang & Litzenberger (1989) suggest

[4] Inflation is calculated as the relative change in consumer price index (CPI).

agency conflicts to be more prevalent in mature firms without growth opportunities. On the other hand, these mature firms are less likely to be confronted with problems of information asymmetry (Turner et al., 2013). In order to take this into account, we run regression models, in which we link firm maturity to dividend policy.

Firm maturity is measured by firm age and firm size. Firm age is calculated as the natural logarithm of the number of years since a stocks' introduction at the BSE, firm size is measured as the natural logarithm of the market capitalization of a stock at the end of each year. The market capitalization is calculated by the number of outstanding shares at the end of the year multiplied by the year-end stock price. Dividend policy is now measured in only two different ways: the firm-level dividend yield at the end of each year and the propensity to pay, which is equal to 1 if a firm has paid a dividend in year t and 0 otherwise. According to Lang & Litzenberger (1989), we will find a positive relationship between firm maturity and dividend policy if agency conflicts are important for the dividend policy of firms. However, if information asymmetry is the dominating factor in determining the dividend policy, we will find a negative relationship between firm maturity and dividend policy (Turner et al., 2013). In order to take into account differences in dividend policy as identified by the structural break analysis, we also include a time-dummy in the regressions. Taking into account the clear-cut impact of World War I and World War II on the dividend policy of listed Belgian firms, we distinguish between six different periods: the pre-war period (1838-1913), World War I (1914-1918), the Interbellum (1919-1939), World War II (1940-1945), the early post-war period (1946-1985) and the late post-war period (1986-2012). Moreover, we also include interaction-effects between the firm characteristics and this time-dummy. This enables us to exploit differences in the driving factors of dividend policy in different periods. We run two fixed effects panel data regressions. For dividend yield, we estimate a tobit-model (truncated at 0), whereas for propensity to pay, we estimate a logit-model. Following Petersen (2009),

we cluster standard errors by as well stock as time, thereby taking into account time-series dependence as well as cross-sectional dependence. Results are reported in Table 8.

With respect to the time-variable, we find that dividend yield and propensity to pay are the highest in the pre-war period, afterwards. We also performed χ^2-tests to test for differences in the coefficients between the remaining periods. None of them is significant at the 5% level. With regard to the effect of maturity on dividend policy, results are mixed. As well as for dividend yield as for propensity to pay, we find a positive significant effect of both size and age in the pre-war period. The effect of size on dividend policy is always positive in the remaining periods and it becomes even stronger after the pre-war period. Based on χ^2-tests, we compare the different subperiods. For dividend yield, we find no differences between the size-effect during World War I, the Interbellum, World War II and the early post-war period. However, in the late post-war period the size effect becomes smaller again. For propensity to pay, the size-effect increases over time: during World War I, the Interbellum and World War II, the positive size-effect is statistically the same, but higher than in the pre-War period. In the early and late post-war period, the size-effect becomes even stronger. In contrast to the size-effect, the effect of age on dividend policy is not always positive. The relationship between age and dividend yield turns out to be negative from the Interbellum onwards and only becomes positive again in the late post-war period. The relationship between age and propensity to pay is negative from World War I onwards and becomes positive again only in the last period. Combining these results, it is difficult to assess whether agency conflicts or information asymmetry are the main drivers of dividend policy. Only in the pre-war period and in the late post-war period, evidence is consistent with the agency explanation, as we find that firm maturity is positively related to dividend policy. During the other periods, evidence is mixed, as we find a negative relationship between dividend policy and firm age but a positive relationship between dividend policy and firm size. Further research is thus necessary

to figure out whether agency conflicts and information asymmetry influences dividend policy if we take firm characteristics into account.

** Insert Table 8 here ***

5. Conclusion

In this paper, we have aimed to answer the question whether the dividend policy of listed Belgian firms has changed since 1838. Previous research showed market frictions, such as agency conflicts, information asymmetry and taxation, to be important reasons why firms pay, or do not pay, dividends. We have shown that the severity of these market frictions changed considerably in Belgium between 1838 and 2012. Information asymmetry and agency conflicts are important in the period before World War I, where the institutional environment is weak and investor protection is limited. By changing legislation – for instance, by introducing and enhancing legislation on publication requirements – information asymmetry and agency conflicts reduce over time. Taxation became relevant only in 1920, when a dividend tax was introduced. We expected that the changing importance of the different market frictions would have an impact of dividend policy of listed Belgian firms.

Surprisingly, we do not find severe changes in dividend policy; on the contrary, we show dividend policy to have been fairly stable over time. Using structural break analysis, we find only three breaks: at the start of World War I, at the end of World War II and halfway through the 1980s. During and between both world wars, the dividend yield dropped and more firms decreased, omitted to or did not pay a dividend, whereas fewer firms maintained a stable dividend. However, removing the war-years (1914-1918 and 1940-1945) from our analysis, we have shown that dividend policy did not change in the Interbellum and that the dividend policy is the same before World War I and after World War II. This means that both world wars had a severe impact on the dividend policy of listed Belgian firms. The break in the mid-

1980s can be explained by changes in the characteristics of firms. From the start of the 1980s, many new firms were attracted to the BSE, whereas mature firms tended to delist. To take into account the effect of changing firm characteristics on dividend policy, we repeated the structural break analysis, considering only firms that were listed for at least ten years. This analysis reveals that there is no break in the mid-1980s anymore, which shows that changing firm characteristics were responsible for the last break.

Notwithstanding huge changes in the institutional environment and the general belief that the institutional environment affects dividend policy, we do, surprisingly enough, not find severe structural changes in the dividend policy of listed Belgian firms. Dividend policy seems to be fairly stable over time; World War I and World War II clearly put a stamp on dividend policy in Belgium. The change of dividend policy in the mid-1980s is driven by an increasing number of young firms and a decrease in the number of mature firms. We thus find no evidence that dividend policy is driven by agency conflicts, information asymmetry or taxation. Further research is therefore necessary to determine what drives firms to pay or not to pay dividends and to unravel the mystery surrounding dividend policy.

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Figure 1 - Evolution of the number of firms stocks at the BSE, per age category

This figure shows the evolution of the number of listed stocks in our sample. Stocks are subdivided in different categories based on firm age. Firm age is measured as the number of years since the IPO. Firms are subdivided in three different categories based on age (younger than 10 years, between 10 and 20 years, older than 20 years).

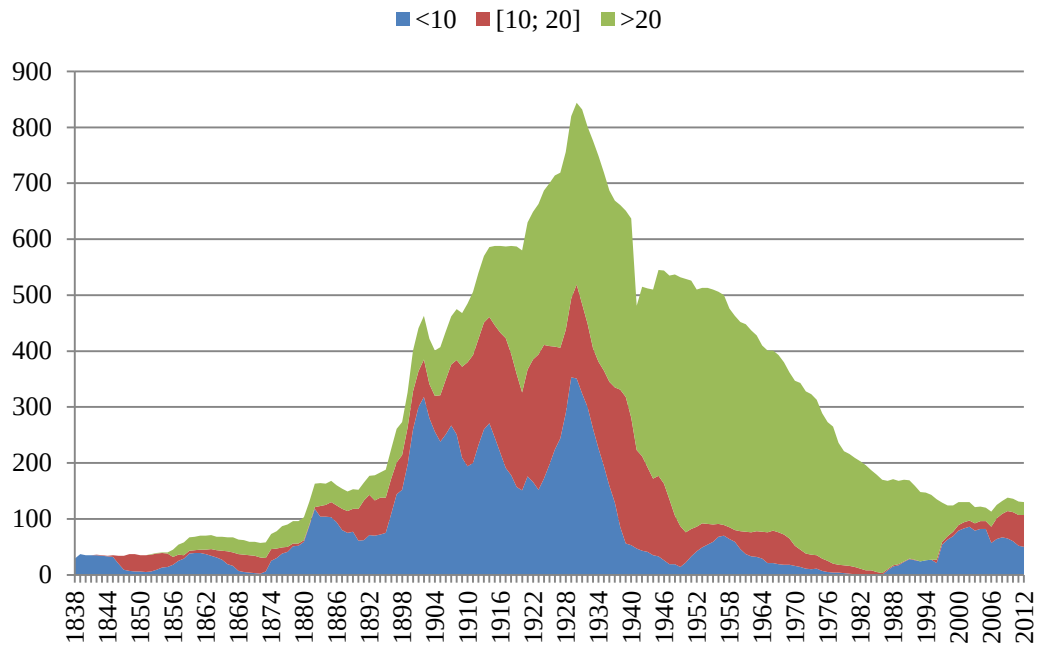

Figure 2 – Evolution of the dividend yield, 1838-2012

This figure shows the evolution of the value-weighted dividend yield between 1838 and 2012. Value-weighted dividend yield is calculated as the average dividend yield of the individuals stocks, based on market size of the stocks. The means are calculated as the arithmetic average of the value-weighted dividend yield in five different periods (1838-1913; 1914-1918 (World War I); 1919-1939; 1940-1945 (World War II); 1946-2012).

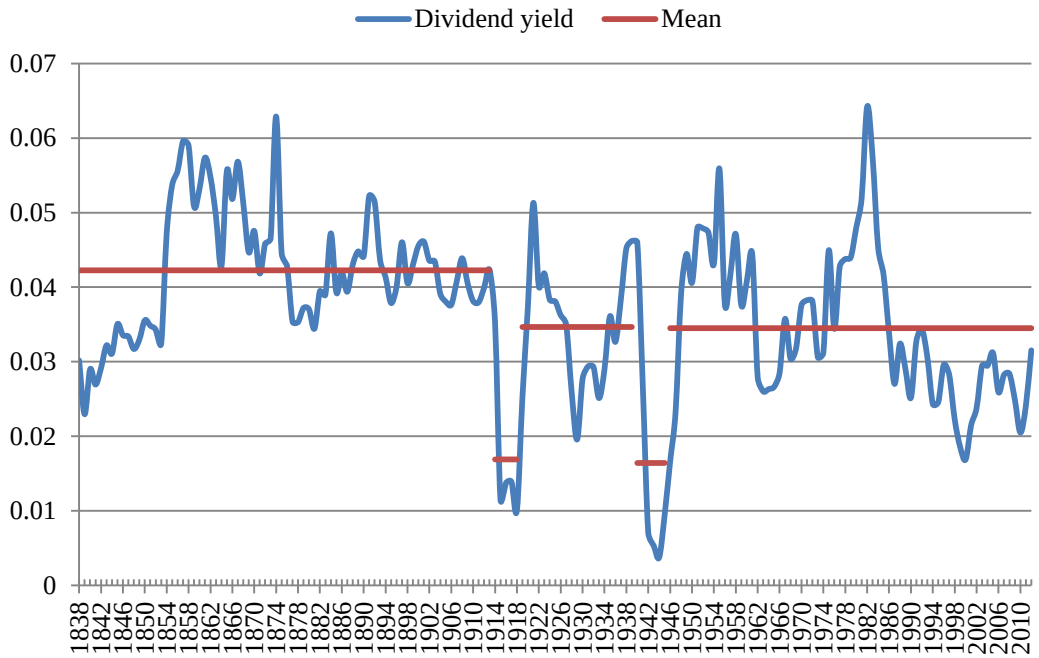

Figure 3 – Evolution of the propensity to pay, 1838-2012

This figure shows the evolution of the propensity to pay between 1838 and 2012. Propensity to pay is calculated as the number of stocks paying a dividend in year t divided by the total number of stocks.. The means are calculated as the arithmetic average of the propensity to pay in five different periods (1838-1913; 1914-1918 (World War I); 1919-1939; 1940-1945 (World War II); 1946-2012).

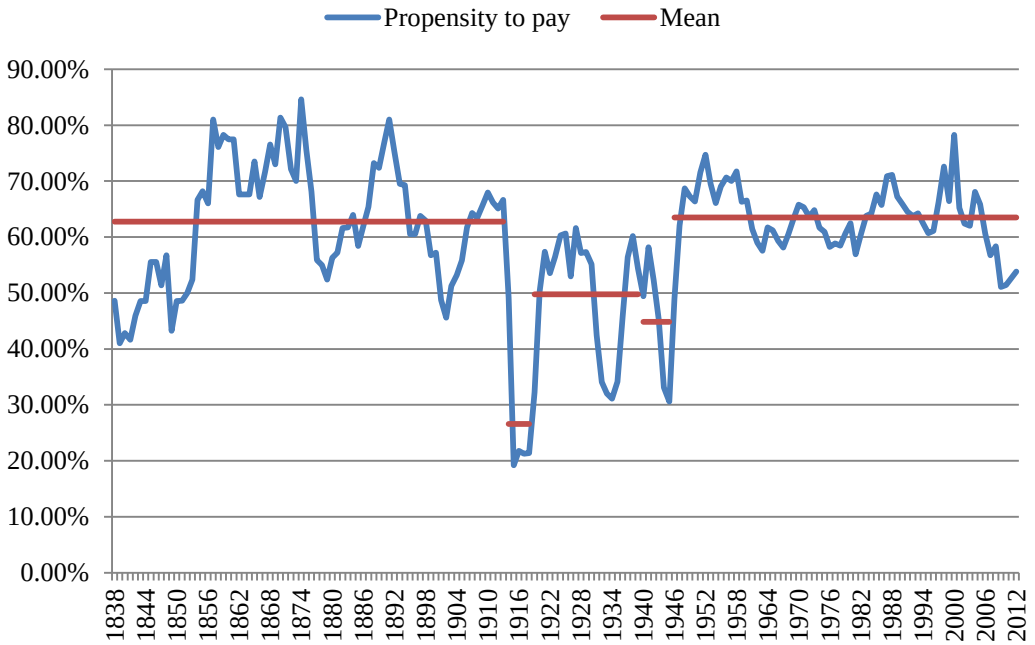

Figure 4 – Evolution of the propensity to change, 1838-2012

This figure shows the evolution of the three propensities to change between 1838 and 2012. The propensity to increase includes all the firms increasing their nominal dividends per share, including firms initiating a dividend. The propensity to maintain a stable dividend includes all the firms with exactly the same nominal dividend per share in year t as in year t-1. The propensity to decrease, not to pay measures all the firms who decrease their dividend, including firms omitting their dividends and firms that do not pay a dividend.

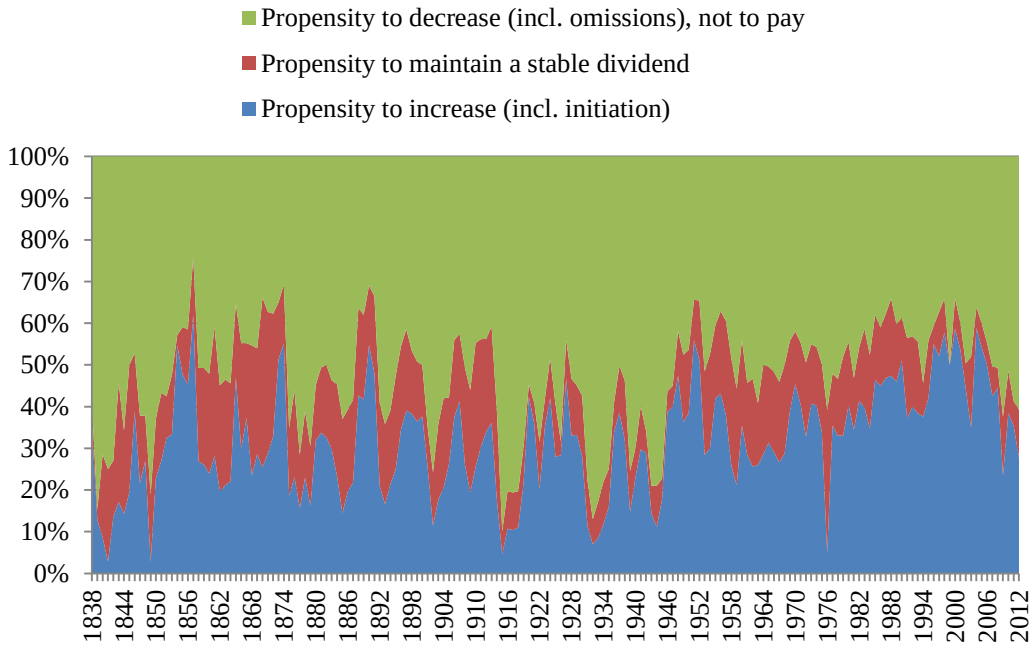

Table 1 – The evolution of dividend taxation in Belgium

In this table, the evolution of the Belgian dividend taxation system is shown. A distinction is made between direct dividend taxation (here the dividend tax rate is shown) and indirect dividend taxation. Dividends might be taxed indirectly in two different ways: either as part of the company profits and/or as part of the global income of the tax payer. The table shows dividends are often taxed twice or even three times. Only in the period between 1930 and 1940 and between 1947 and 1961dividends are taxed only by a direct dividend taxation.

	Dividend tax rate	***Tax on company profits?***	***Taxed as part of the global income of the tax payer?***
1920	10%	NO	YES
1923	15%	NO	YES
1926	22%	NO	YES
1930	22%	NO	NO
1932	24.2%	NO	NO
1940	26.4%	NO	NO
1941	10%	YES	NO
1942	12%	YES	NO
1943	15%	YES	NO
1947	30%	NO	NO
1962	15%	YES	YES
1967	20%	YES	YES
1985	25%	YES	NO
2012	25%	YES	YES

Source: Buissert & Cauwe (1947); Buissert (1943); Centre d'étude des sociétés (1941); De Mey (1930); Dielen (1933); Ergo Insurance Group (2013); Gilson (1921); Henry (1967); Lapotre (1924); Op de Beeck (2005); Requette (1928); Van Biervliet (1996); Vanthienen & Vermaelen (1987); Wauwermans (1920)

Table 2 – Descriptive statistics

This table shows the descriptive statistics for our main variables: dividend yield, propensity to pay and three propensities to change. The descriptive statistics are calculated for the entire period (1838-2012) as well for five different subperiods (1838-1913; 1914-1918; 1919-1939; 1940-1945; 1946-2012).

Panel A: Value-weighted dividend yield						
	1838-2012	**1838-1913**	**1914-1918**	**1919-1939**	**1940-1945**	**1946-2012**
Mean	3.67%	4.23%	1.69%	3.47%	1.64%	3.41%
St.Dev	1.14%	0.84%	1.04%	0.80%	1.68%	1.06%
Minimum	0.38%	2.30%	1.01%	1.96%	0.38%	0.95%
Median	3.77%	4.19%	1.37%	3.61%	0.83%	3.16%
Maximum	6.42%	6.29%	3.53%	5.13%	4.60%	6.42%
Panel B: Equally-weighted dividend yield						
	1838-2012	**1838-1913**	**1914-1918**	**1919-1939**	**1940-1945**	**1946-2012**
Mean	3.36%	3.75%	1.32%	2.82%	1.64%	3.40%
St.Dev	1.25%	1.04%	0.81%	0.71%	1.27%	1.31%
Minimum	0.62%	2.07%	0.81%	1.58%	0.62%	1.44%
Median	3.32%	3.45%	0.99%	2.90%	1.08%	3.52%
Maximum	6.71%	6.71%	2.75%	4.19%	3.88%	5.93%
Panel C: Propensity to pay						
	1838-2012	**1838-1913**	**1914-1918**	**1919-1939**	**1940-1945**	**1946-2012**
Mean	59.85%	62.78%	26.56%	49.79%	44.82%	63.51%
St.Dev	12.05%	10.95%	12.68%	10.83%	10.91%	5.64%
Minimum	19.22%	41.03%	19.22%	31.13%	30.59%	48.99%
Median	61.63%	63.86%	21.39%	54.42%	47.34%	63.75%
Maximum	84.62%	84.62%	49.17%	61.61%	58.18%	78.26%
Panel D: Propensity to increase (including initiation)						
	1838-2012	**1838-1913**	**1914-1918**	**1919-1939**	**1940-1945**	**1946-2012**
Mean	31.73%	28.68%	10.86%	27.07%	20.83%	39.18%
St.Dev	12.90%	12.20%	4.61%	11.94%	7.66%	10.14%
Minimum	2.70%	2.70%	4.59%	6.99%	11.18%	4.76%
Median	32.56%	26.55%	10.71%	28.30%	20.34%	38.95%
Maximum	62.07%	62.07%	17.61%	46.69%	29.81%	58.87%

Panel E: Propensity to maintain a stable dividend						
	1838-2012	**1838-1913**	**1914-1918**	**1919-1939**	**1940-1945**	**1946-2012**
Mean	15.39%	18.99%	10.68%	9.36%	7.34%	14.28%
St.Dev	7.05%	6.75%	6.10%	3.29%	2.28%	6.18%
Minimum	0.00%	2.38%	5.44%	2.95%	4.95%	0.00%
Median	14.87%	18.47%	9.01%	9.47%	6.85%	14.85%
Maximum	40.68%	40.68%	21.26%	14.52%	10.35%	34.43%
Panel F: Propensity to decrease (including omissions), not to pay						
	1838-2012	**1838-1913**	**1914-1918**	**1919-1939**	**1940-1945**	**1946-2012**
Mean	52.88%	52.34%	78.46%	63.57%	71.83%	46.54%
St.Dev	12.94%	12.35%	10.54%	12.16%	7.93%	7.19%
Minimum	24.14%	24.14%	61.13%	43.97%	59.83%	34.06%
Median	50.72%	52.25%	80.31%	59.06%	73.65%	46.40%
Maximum	89.97%	84.62%	89.97%	87.02%	79.02%	62.41%

Table 3 – Summary of the results

In this table, the results of the structural break analysis are summarized. Panel A shows the number of breaks for each variable and the break dates. Panel B shows the parameter estimates of the structural break analysis in the four different subperiods. If the parameter estimate is the same for different subperiods, it means that no break is found. For instance, the propensity to increase is not significantly different in the first three periods and is on average 28.89% between 1838 and 1985. There is a break in the mid-1980s. From then on, the propensity to increase is 43.94%.

Panel A: Number of breaks and break dates		
	Number of breaks	**Break dates**
Dividend yield	3	1914, 1947, 1986
Propensity to pay	0	
Propensity to increase	1	1979
Propensity to maintain a stable dividend	3	1914, 1948, 1986
Propensity to decrease/ not to pay	2	1913, 1945

Panel B: Parameter estimates of the structural break analysis				
	1838- 1913	*1914-1945*	*1946 -1985*	*1986-2012*
Dividend yield	4.22%	2.77%	4.04%	2.67%
Propensity to pay	59.78%			
Propensity to increase	28.89%			43.94%
Propensity to maintain a stable dividend	19.03%	8.63%	17.71%	10.06%
Propensity to decrease/ not to pay	52.34%	67.44%	46.54%	

Table 4 – Summary of the results – Excluding World Wars (1914-1918; 1940-1945)

In this table, the results of the structural break analysis, where the War years (1914-1918, 1940-1945) are excluded, are summarized. Panel A shows the number of breaks for each variable and the break dates. Panel B shows the parameter estimates of the structural break analysis in the four different subperiods. If the parameter estimate is the same for different subperiods, it means that no break is found. For instance, the propensity to increase is not significantly different in the first three periods and is on average 29.94% between 1838 and 1985. There is a break in the mid-1980s. From then on, the propensity to increase is 43.94%.

Panel A: Number of breaks and break dates		
	Number of breaks	**Break dates**
Dividend yield	1	1986
Propensity to pay	0	
Propensity to increase	1	1979
Propensity to maintain a stable dividend	3	1913, 1951, 1987
Propensity to decrease/ not to pay	1	1947

Panel B: Parameter estimates of the structural break analysis				
	1838- 1913	*1914-1945*	*1946 -1985*	*1986-2012*
Dividend yield	4.03%			2.67%
Propensity to pay	61.41%			
Propensity to increase	29.94%			43.94%
Propensity to maintain a stable dividend	18.99%	9.58%	17.99%	9.90%
Propensity to decrease/ not to pay	54.79%		46.26%	

Table 5 – Summary of the results – Mature firms

In this table, the results of the structural break analysis for mature firms (this are firms listed at least 10 years) are summarized. Panel A shows the number of breaks for each variable and the break dates. Panel B shows the parameter estimates of the structural break analysis in the four different subperiods. If the parameter estimate is the same for different subperiods, it means that no break is found. For instance, the propensity to increase is not significantly different in the first three periods and is on average 29.19% between 1838 and 1985. There is a break in the mid-1980s. From then on, the propensity to increase is 44.71%.

Panel A: Number of breaks and break dates		
	Number of breaks	**Break dates**
Propensity to pay	2	1913, 1946
Propensity to increase	1	1979
Propensity to maintain a stable dividend	2	1914, 1948
Propensity to decrease/ not to pay	2	1913, 1946

Panel B: Parameter estimates of the structural break analysis				
	1838- 1913	*1914-1945*	*1946 -1985*	*1986-2012*
Propensity to pay	72.08%	46.94%	65.41%	
Propensity to increase		29.19%		44.71%
Propensity to maintain a stable dividend	23.88%	8.93%	15.87%	
Propensity to decrease/ not to pay	47.02%	65.49%	45.28%	

Table 6 - Descriptive statistics inflation

This table shows the descriptive statistics for inflation in Belgium. The descriptive statistics are calculated for the entire period (1838-2012) as well for four different subperiods (1838-1913; 1914-1945; 1946-1985; 1986-2012).

	1838-2012	**1838-1913**	**1914-1945**	**1946-1985**	**1986-2012**
Mean	3.89%	0.31%	12.29%	5.17%	2.14%
St.Dev	10.39%	5.43%	19.82%	5.07%	0.89%
Minimum	-16.03%	-14.74%	-16.03%	-4.58%	0.26%
Median	2.24%	0.00%	7.77%	4.00%	2.23%
Maximum	78.53%	19.15%	78.53%	18.90%	3.61%

Source: Own calculations based on Deweirdt et al. (1997); FOD Economie, KMO, Middenstand & Energie (2014); Michotte (1937); Scholliers (1978)

Table 7 – Summary of the results – Inflation

In this table, the results of the structural break analysis for real propensity to increase and real propensity to cut are summarized. Panel A shows the number of breaks for each variable and the break dates. Panel B shows the parameter estimates of the structural break analysis in the four different subperiods. If the parameter estimate is the same for different subperiods, it means that no break is found. For instance, for propensity to increase there is a break in 1914. In the period between 1838 and 1913, the propensity is on average 30.16%. The propensity to increase is not different in the early and late post-war period and is 39.29% between 1946 and 2012.

Panel A: Number of breaks and break dates		
	Number of breaks	**Break dates**
Propensity to increase	2	1914, 1949
Propensity to cut	2	1896, 1986

Panel B: Parameter estimates of the structural break analysis				
	1838- 1913	*1914-1945*	*1946 -1985*	*1986-2012*
Propensity to increase	30.16%	19.22%	39.29%	
	1838- 1895	*1895-1985*		*1986-2012*
Propensity to cut	26.53%	19.59%		13.48%

Table 8 – Firm maturity and dividend policy

This table shows the results of the fixed-effects panel data analysis. The first number is the coefficient estimate. *, ** and *** represent significance at the 10%, 5% and 1% level respectively. The numbers between brackets are the Z-statistics.

	Panel A: Dividend yield	**Panel B: Propensity to pay**
Intercept	-0.57533 ***	-13.82732 ***
	(0.0382)	(1.4658)
Ln(age)	0.00330 ***	0.23814 **
	(0.0005)	(0.0609)
Ln(size)	0.00678 ***	0.42968 ***
	(0.0006)	(0.0715)
World War I	-0.20519 ***	-7.62841 ***
	(0.0568)	(2.2139)
Interbellum	-0.15456 ***	-6.89821 ***
	(0.0273)	(1.2272)
World War II	-0.16783 ***	-5.62055 **
	(0.0463)	(1.7934)
Early post-war period	-0.13594 ***	-6.86162 ***
	(0.0313)	(1.4866)
Late post-war period	-0.13964 ***	-9.29345 ***
	(0.0401)	(2.0263)
Ln(age) * World War I	-0.00254	-0.34152 **
	(0.0039)	(0.1303)
Ln(age) * Interbellum	-0.00712 ***	-0.49720 ***
	(0.0016)	(0.1018)
Ln(age) * World War II	-0.01344 **	-0.74244 ***
	(0.0042)	(0.1897)
Ln(age) * Early post-war period	-0.00839 ***	-1.13884 ***
	(0.0020))	(0.1777)
Ln(age) * Late post-war period	0.00246 *	-0.23557
	(0.0011)	(0.1755)
Ln(size) * World War I	0.00933 ***	0.38604 ***
	(0.0015)	(0.1101)
Ln(size) * Interbellum	0.00912 ***	0.43948 ***
	(0.0009)	(0.0701)
Ln(size) * World War II	0.00964 ***	0.37598 ***
	(0.0025)	(0.1013)
Ln(size) * Early post-war period	0.00862 ***	0.58168 ***
	(0.0006)	(0.0788)
Ln(size) * Late post-war period	0.00557 ***	0.51656 ***
	(0.0005)	(0.1056)

Appendix A – Output of the structural break analysis

In Appendix-Table A.1 the outputs for the structural break analysis are reported. We will discuss the interpretation for value-weighted dividend yield. The interpretation for the other variables is analogues. In the first part of each panel, the model is specified. Following Bai & Perron (1998, 2003) the structural break analysis estimates a multiple linear regression model with m breaks of the form $y_t = x_t'\beta + z_t'\delta_j + u_t$: z_t is a (q x 1) vector of covariates, which consists of ones, and x_t is a matrix of regressors with fixed coefficients across regimes; p = 0 (there are no independent variables without structural breaks in the model i.e. x is not included in the model) and q = 1 (there is one independent variable with structural breaks). In each period, at least 26 observations (h = 26) are included. We allow for a maximum of 5 structural breaks (M = 5). In the second part of the panel, four different types of tests are conducted in order to test whether there are structural breaks in the data. The first test is the SupF-test of zero breaks versus a fixed number of breaks (going from one to five breaks, as specified above). For dividend yield, the SupF-test of two breaks, as well as the SupF-tests of three, four and five breaks are significant, leading to the conjecture that structural breaks are present. The second tests is the SupF-test of l+1 breaks given the presences of l breaks. Here, neither of these tests is significant at the 10%-level. Finally, the so-called unweighted maximization test (UDmax-test) and the weighted maximization test (WD-max test) are performed. These test are both significant at the 1%-level. As three of the four tests reject the null-hypothesis of no structural breaks, dividend yield changes considerably. In the third part of the panel, the number of breaks are selected. Here, there are three different procedures: the sequential procedure, LWZ and BIC. The first procedure does not find any breaks, whereas LWZ and BIC find both three breaks in the data. In the last part of each panel, parameter estimates ($\widehat{\delta_1}, \widehat{\delta_2}, \widehat{\delta_3}$ and $\widehat{\delta_4}$) and their standard errors (between brackets) are shown as well as estimations for when there are breaks in the data ($\widehat{T_1}, \widehat{T_2}$ and $\widehat{T_3}$).

Appendix-Table A.1 - Output structural break analysis – original variables

Panel A: Value-weighted dividend yield				
Specifications				
z_t = (1)	q = 1	p = 0	h = 26	M = 5
Tests				
$SupF_T(1)$	$SupF_T(2)$	$SupF_T(3)$	$SupF_T(4)$	$SupF_T(5)$
4.45	12.50	10.16	12.70	7.65
	(***)	(***)	(***)	(***)
$SupF_T(2\|1)$	$SupF_T(3\|2)$	$SupF_T(4\|3)$	$SupF_T(5\|4)$	
2.41	2.01	0.07	0	
UDmax	WDmax			
12.70	12.70			
(***)	(***)			
Number of breaks selected				
Sequential procedure			0	
LWZ			3	
BIC			3	
Estimates with three break				
$\widehat{\delta_1}$	$\widehat{\delta_2}$	$\widehat{\delta_3}$	$\widehat{\delta_4}$	
0.0422	0.0277	0.0404	0.0267	
(9.578e-4)	(0.0023)	(0.0014)	(8.762e-4)	
$\widehat{T_1}$	$\widehat{T_2}$	$\widehat{T_3}$		
1914	1947	1986		

Panel B: Propensity to pay				
Specifications				
z_t = (1)	q = 1	p = 0	h = 26	M = 5
Tests				
$SupF_T(1)$	$SupF_T(2)$	$SupF_T(3)$	$SupF_T(4)$	$SupF_T(5)$
0.93	2.65	1.96	1.61	1.74
$SupF_T(2\|1)$	$SupF_T(3\|2)$	$SupF_T(4\|3)$	$SupF_T(5\|4)$	
3.81	0.56	0.56	0	
UDmax	WDmax			
2.65	2.65			
Number of breaks selected				
Sequential procedure			0	
LWZ			0	
BIC			2	
No breaks selected				

Panel C: Propensity to increase				
Specifications				
z_t = (1)	q = 1	p = 0	h = 26	M = 5
Tests				
$SupF_T(1)$	$SupF_T(2)$	$SupF_T(3)$	$SupF_T(4)$	$SupF_T(5)$
22.14	11.49	8.02	6.13	4.48
(***)	(***)	(**)	(**)	(**)
$SupF_T(2\|1)$	$SupF_T(3\|2)$	$SupF_T(4\|3)$	$SupF_T(5\|4)$	
4.94	1.04	0.41	0	
UDmax	WDmax			
22.14	22.14			
(***)	(***)			
Number of breaks selected				
Sequential procedure			1	
LWZ			1	
BIC			2	
Estimates with one break				
$\widehat{\delta_1}$	$\widehat{\delta_2}$			
0.2889	0.4394			
(0.0097)	(0.0201)			
$\widehat{T_1}$				
1979				

Panel D: Propensity to maintain a stable dividend				
Specifications				
z_t = (1)	q = 1	p = 0	h = 26	M = 5
Tests				
$SupF_T(1)$	$SupF_T(2)$	$SupF_T(3)$	$SupF_T(4)$	$SupF_T(5)$
15.75	31.60	34.17	25.75	18.82
(***)	(***)	(***)	(***)	(***)
$SupF_T(2\|1)$	$SupF_T(3\|2)$	$SupF_T(4\|3)$	$SupF_T(5\|4)$	
17.75	23.12	1.14	0	
(***)	(***)			
UDmax	WDmax			
34.17	34.17			
(***)	(***)			
Number of breaks selected				
Sequential procedure			3	
LWZ			3	
BIC			3	
Estimates with one break				
$\widehat{\delta_1}$	$\widehat{\delta_2}$	$\widehat{\delta_3}$	$\widehat{\delta_4}$	
0.1903	0.0863	0.1771	0.1006	
(0.0077)	(0.0052)	(0.0074)	(0.0096)	
$\widehat{T_1}$	$\widehat{T_2}$	$\widehat{T_3}$		
1914	1948	1986		

Panel E: Propensity to decrease, not to pay				
Specifications				
z_t = (1)	q = 1	p = 0	h = 26	M = 5
Tests				
$SupF_T(1)$	$SupF_T(2)$	$SupF_T(3)$	$SupF_T(4)$	$SupF_T(5)$
9.43	10.33	7.25	5.55	4.10
(**)	(***)	(**)	(**)	(**)
$SupF_T(2\|1)$	$SupF_T(3\|2)$	$SupF_T(4\|3)$	$SupF_T(5\|4)$	
7.99	1.44	1.44	0	
UDmax	WDmax			
10.33	10.33			
(**)	(**)			
Number of breaks selected				
Sequential procedure			2	
LWZ			2	
BIC			1	
Estimates with one break				
$\widehat{\delta_1}$	$\widehat{\delta_2}$	$\widehat{\delta_3}$		
0.5234	0.6744	0.4654		
(0.0123)	(0.0189)	(0.0131)		
$\widehat{T_1}$	$\widehat{T_2}$			
1913	1945			

*, ** and *** represents significance at the 10%, 5% and 1%-level respectively

Appendix-Table 2 - Output structural break analysis – Excluding World Wars (1914-1918; 1940-1945)

Panel A: Dividend yield				
Specifications				
z_t = (1)	q = 1	p = 0	h = 25	M = 5
Tests				
$SupF_T(1)$	$SupF_T(2)$	$SupF_T(3)$	$SupF_T(4)$	$SupF_T(5)$
26.94	14.19	9.88	13.55	10.45
(***)	(***)	(***)	(***)	(***)
$SupF_T(2\|1)$	$SupF_T(3\|2)$	$SupF_T(4\|3)$	$SupF_T(5\|4)$	
1.65	1.63	0.06	0	
UDmax	WDmax			
26.94	26.94			
(***)	(***)			
Number of breaks selected				
Sequential procedure			1	
LWZ			1	
BIC			1	
Estimates with one break				
$\widehat{\delta_1}$	$\widehat{\delta_2}$			
0.0403	0.0267			
($7.296e^{-4}$)	(0.0017)			
$\widehat{T_1}$				
1986				

Panel B: Propensity to pay				
Specifications				
z_t = (1)	q = 1	p = 0	h = 25	M = 5
Tests				
$SupF_T(1)$	$SupF_T(2)$	$SupF_T(3)$	$SupF_T(4)$	$SupF_T(5)$
0.76	3.81	2.48	2.00	0.80
$SupF_T(2\|1)$	$SupF_T(3\|2)$	$SupF_T(4\|3)$	$SupF_T(5\|4)$	
2.48	0.53	0.56	0	
UDmax	WDmax			
3.81	3.81			
Number of breaks selected				
Sequential procedure			0	
LWZ			0	
BIC			3	
No breaks selected				

Panel C: Propensity to increase				
Specifications				
z_t = (1)	q = 1	p = 0	h = 25	M = 5
Tests				
$SupF_T(1)$	$SupF_T(2)$	$SupF_T(3)$	$SupF_T(4)$	$SupF_T(5)$
20.35	10.32	6.73	5.20	4.13
(***)	(***)	(**)	(**)	(**)
$SupF_T(2\|1)$	$SupF_T(3\|2)$	$SupF_T(4\|3)$	$SupF_T(5\|4)$	
3.62	0.26	0.70	0	
UDmax	WDmax			
20.35	20.35			
(***)	(***)			
Number of breaks selected				
Sequential procedure			1	
LWZ			1	
BIC			1	
Estimates with two breaks				
$\widehat{\delta_1}$	$\widehat{\delta_2}$			
0.2994	0.4394			
(0.0098)	(0.0196)			
$\widehat{T_1}$				
1979				

Panel D: Propensity to maintain a stable dividend				
Specifications				
z_t = (1)	q = 1	p = 0	h = 25	M = 5
Tests				
$SupF_T(1)$	$SupF_T(2)$	$SupF_T(3)$	$SupF_T(4)$	$SupF_T(5)$
12.20	19.07	22.51	17.10	13.48
(**)	(***)	(***)	(***)	(***)
$SupF_T(2\|1)$	$SupF_T(3\|2)$	$SupF_T(4\|3)$	$SupF_T(5\|4)$	
10.58	26.41	1.48	0.39	
(**)	(***)			
UDmax	WDmax			
22.51	22.51			
(***)	(***)			
Number of breaks selected				
Sequential procedure			3	
LWZ			3	
BIC			3	
Estimate with three breaks				
$\widehat{\delta_1}$	$\widehat{\delta_2}$	$\widehat{\delta_3}$	$\widehat{\delta_4}$	
0.1899	0.0958	0.1799	0.0990	
(0.0065)	(0.0109)	(0.0094)	(0.0113)	
$\widehat{T_1}$	$\widehat{T_2}$	$\widehat{T_3}$		
1913	1951	1987		

Panel E: Propensity to decrease, not to pay				
Specifications				
z_t = (1)	q = 1	p = 0	h = 25	M = 5
Tests				
$SupF_T(1)$	$SupF_T(2)$	$SupF_T(3)$	$SupF_T(4)$	$SupF_T(5)$
7.89	7.01	3.91	3.08	2.41
(*)	(*)			
$SupF_T(2\|1)$	$SupF_T(3\|2)$	$SupF_T(4\|3)$	$SupF_T(5\|4)$	
3.10	1.08	1.41	0	
UDmax	WDmax			
7.89	7.89			
(*)	(*)			
Number of breaks selected				
Sequential procedure			1	
LWZ			1	
BIC			2	
Estimates with one break				
$\widehat{\delta_1}$	$\widehat{\delta_2}$			
0.5479	0.4626			
(0.0111)	(0.0137)			
$\widehat{T_1}$				
1947				

*, ** and *** represents significance at the 10%, 5% and 1%-level respectively

Appendix-Table 3 - Output structural break analysis – Mature firms

Panel A: Propensity to pay					*Panel B: Propensity to increase*				
Specifications					**Specifications**				
z_t = (1)	q = 1	p = 0	h = 25	M = 5	z_t = (1)	q = 1	p = 0	h = 25	M = 5
Tests					**Tests**				
$SupF_T(1)$	$SupF_T(2)$	$SupF_T(3)$	$SupF_T(4)$	$SupF_T(5)$	$SupF_T(1)$	$SupF_T(2)$	$SupF_T(3)$	$SupF_T(4)$	$SupF_T(5)$
4.54	5.29	10.35 (***)	8.15 (***)	4.78 (**)	34.30 (***)	19.93 (***)	14.52 (***)	10.69 (***)	8.14 (***)
$SupF_T(2\|1)$	$SupF_T(3\|2)$	$SupF_T(4\|3)$	$SupF_T(5\|4)$		$SupF_T(2\|1)$	$SupF_T(3\|2)$	$SupF_T(4\|3)$	$SupF_T(5\|4)$	
6.65	2.81	2.81	0		3.43	1.18	0.13	0	
UDmax	WDmax				UDmax	WDmax			
10.35 (**)	10.35 (**)				34.30 (***)	34.30 (***)			
Number of breaks selected					**Number of breaks selected**				
Sequential procedure			0		Sequential procedure			1	
LWZ			2		LWZ			1	
BIC			2		BIC			1	
Estimates with two breaks					**Estimates with one break**				
$\widehat{\delta_1}$	$\widehat{\delta_2}$	$\widehat{\delta_3}$			$\widehat{\delta_1}$	$\widehat{\delta_2}$			
0.7208	0.4694	0.6541			0.2919	0.4471			
(0.0117)	(0.0165)	(0.0117)			(0.0102)	(0.0203)			
$\widehat{T_1}$	$\widehat{T_2}$				$\widehat{T_1}$				
1913	1946				1979				
Panel C: Propensity to maintain a stable dividend					***D: Propensity to decrease, not to pay***				
Specifications					**Specifications**				
z_t = (1)	q = 1	p = 0	h = 25	M = 5	z_t = (1)	q = 1	p = 0	h = 25	M = 5
Tests					**Tests**				
$SupF_T(1)$	$SupF_T(2)$	$SupF_T(3)$	$SupF_T(4)$	$SupF_T(5)$	$SupF_T(1)$	$SupF_T(2)$	$SupF_T(3)$	$SupF_T(4)$	$SupF_T(5)$
33.21 (***)	44.81 (***)	58.73 (***)	41.13 (***)	20.57 (***)	11.47 (**)	11.48 (***)	8.22 (***)	10.18 (***)	5.12 (***)
$SupF_T(2\|1)$	$SupF_T(3\|2)$	$SupF_T(4\|3)$	$SupF_T(5\|4)$		$SupF_T(2\|1)$	$SupF_T(3\|2)$	$SupF_T(4\|3)$	$SupF_T(5\|4)$	
37.34 (***)	8.15	8.15	0		3.94	15.02 (***)	15.02 (**)	0	
UDmax	WDmax				UDmax	WDmax			
58.73 (***)	58.73 (***)				11.48 (**)	11.48 (**)			
Number of breaks selected					**Number of breaks selected**				
Sequential procedure			2		Sequential procedure			1	
LWZ			2		LWZ			2	
BIC			4		BIC			3	
Estimates with two breaks					**Estimates with two breaks**				
$\widehat{\delta_1}$	$\widehat{\delta_2}$	$\widehat{\delta_3}$			$\widehat{\delta_1}$	$\widehat{\delta_2}$	$\widehat{\delta_3}$		
0.2388	0.0893	0.1587			0.4702	0.6549	0.4528		
(0.0076)	(0.0106)	(0.0077)							
$\widehat{T_1}$	$\widehat{T_2}$				$\widehat{T_1}$	$\widehat{T_2}$			
1914	1948				1913	1946			

*, ** and *** represents significance at the 10%, 5% and 1%-level respectively

Appendix-Table 4 - Output structural break analysis – Inflation

Panel A: Propensity to increase the real dividend					*Panel B: Propensity to decrease the real dividend*				
Specifications					**Specifications**				
z_t = (1)	q = 1	p = 0	h = 25	M = 5	z_t = (1)	q = 1	p = 0	h = 25	M = 5
Tests					**Tests**				
$SupF_T(1)$	$SupF_T(2)$	$SupF_T(3)$	$SupF_T(4)$	$SupF_T(5)$	$SupF_T(1)$	$SupF_T(2)$	$SupF_T(3)$	$SupF_T(4)$	$SupF_T(5)$
20.41	23.10	17.98	13.61	10.42	12.46	14.87	10.80	8.87	7.00
(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)	(***)
$SupF_T(2\|1)$	$SupF_T(3\|2)$	$SupF_T(4\|3)$	$SupF_T(5\|4)$		$SupF_T(2\|1)$	$SupF_T(3\|2)$	$SupF_T(4\|3)$	$SupF_T(5\|4)$	
37.34	8.15	8.15	0		3.94	15.02	15.02	0	
(***)						(***)	(**)		
UDmax	WDmax				UDmax	WDmax			
23.10	23.10				14.87	14.87			
(***)	(***)				(***)	(***)			
Number of breaks selected					**Number of breaks selected**				
Sequential procedure		2			Sequential procedure		2		
LWZ		1			LWZ		0		
BIC		2			BIC		1		
Estimates with two breaks					**Estimates with two breaks**				
$\widehat{\delta_1}$	$\widehat{\delta_2}$	$\widehat{\delta_3}$			$\widehat{\delta_1}$	$\widehat{\delta_2}$	$\widehat{\delta_3}$		
0.3016	0.1922	0.3929			0.2653	0.1959	0.1348		
(0.0152)	(0.0225)	(0.0168)			(0.0169)	(0.0137)	(0.0255)		
$\widehat{T_1}$	$\widehat{T_2}$				$\widehat{T_1}$	$\widehat{T_2}$			
1914	1949				1896	1986			

*, ** and *** represents significance at the 10%, 5% and 1%-level respectively