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Dividend growth and return predictability:
A long-run re-examination of conventional wisdom

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Abstract

We re-examine dividend growth and return predictability evidence using 165 years of data from the Brussels Stock Exchange. The conventional wisdom holds that time-varying dividend yield is predominately explained by changes in expected returns and that expected dividend growth is only weakly forecastable. However, we find robust dividend growth predictability evidence in every time period. A lack of dividend smoothing is the most important reason for the disconnect with previous evidence. Furthermore, we find return predictability in the post–World War II period when we adjust the dividend yields for changing index composition, business cycle variation and structural breaks. This is explained by a simultaneous increase in equity duration, induced by an increasing importance of growth stocks.

Code

G12, G17, N2

Highlights

- Dividend growth predictability evidence is a robust characteristic of the Brussels Stock Exchange.
- Lack of dividend smoothing is one reason for robust dividend growth predictability.
- Return predictability is present only with adjusted dividend yields.
- The presence of return predictability is explained by an increase in equity duration.

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One fundamental question in asset pricing is whether stock prices move because of news related to expected cash flows or because of news related to expected returns. The answer to this question is commonly inferred from predictive regressions. Among all the variables proposed as the predictors, dividend yield has the most theoretical appeal. Aggregated dividend yield is the summation of future expected cash flows discounted at the required rate of return. Time-varying dividend yields are interpreted as the changes in expected dividend growth, expected returns, or both. Conventional wisdom holds that expected returns are predictable through dividend yields (Golez and Koudijs, 2018) and expected dividend growth is 'only' weakly predictable (Ang and Bekaert, 2007; Lettau and Ludvigson, 2005). The majority of the literature, however, uses data going back no further than 1926. The focus on relatively recent data raises concerns on how representative the conclusions are for capital markets. Since this topic has several applications, such as asset allocation (Muñoz and Vicente, 2018), we re-examine this wisdom by introducing 165 years of data from the Brussels Stock Exchange (BSE).

We study the abilities of dividend yield to predict expected dividend growth and expected returns on a largely independent dataset. Using a long time series has several advantages relative to other papers.[1] For instance, we are able to better establish the impact of changeable institutional or economic environments on dividend growth and return predictability. Following Cochrane (2008), we impose a joint null hypothesis of no dividend growth (return) predictability with forecastable expected returns (expected dividend growth), since dividend yield variation must come from one of these two sources. Since we use an annual frequency, we must decide how dividends received within a year are reinvested, at the market return (Cochrane, 2008), at the risk-free rate (van Binsbergen and Koijen, 2010) or not reinvested at all (Chen, 2009). In this article, we apply dividends without reinvestment since this provides a more pure dividend metrics (Chen, 2009).

Our key findings are as follows. First, we find large predictable movements in expected dividend growth rates. Dividend yields are both economically and statistically significant as a predictor of expected dividend growth. Regression coefficients are always negative, as expected. Overall, we find the strongest evidence in the pre–World War I years, although there is dividend growth predictability evidence in the post–World War II period. The latter is in contrast with previous U.S. evidence (Chen, 2009). Since this conclusion is new, we control for additional predictors, use portfolio sorts based on firm characteristics, and target sectors as robustness tests. In sum, we show that dividend growth predictability is a salient characteristic for the BSE.

A lack of dividend smoothing can explain the robustness of dividend growth predictability, particularly in the post–World War II period. When firms smooth dividends, dividend growth is not determined solely by a firm's earnings changes but also by past dividend payouts. This can potentially bias dividend growth rates and make dividend growth predictability hard to find. Overall, we document no evidence of dividend smoothing for the

[1] The literature that uses non-US countries includes Engsted and Pedersen (2010) with 80 years of data for Denmark and Sweden; Rangvid et al. (2014) have international data as of 1973 and Ang and Bekaert (2007) base their conclusions on data as of 1953 for Germany and 1973 for France.

aggregate Belgian market, which contrasts with U.S. evidence (Chen, Da, & Priestley, 2012). This finding holds when we target a subsample less likely to smooth dividends, that is, small-caps stocks. Even in the robustness tests, we find no evidence of dividend smoothing. This evidence adds to the growing non-US evidence against dividend smoothing (Andres et al., 2009; Dewenter and Warther, 1998).

Finally, we find evidence of return predictability in the post–World War II period when we adjust the dividend yield for structural breaks or a changing index composition. The presence of return predictability in the most recent period is explained by a coinciding increase in equity duration. Equity duration is defined as stock price sensitivity to changes in discount rates. As equity duration increases, the stream of future cash-flows is tilted toward the future, where changes in expected returns are more influential than changes in future cash-flows. We find that expected returns are predictable solely when equity duration is high, which is in the post–World War II years. This result holds when we focus on size-sorted portfolios. Increase in equity duration, in turn, is explained by an IPO wave in the mid-1980s, which introduced a relatively high number of growth firms.

We make three contributions. First, we use a new, largely independent dataset. To the best of our knowledge, the present paper is the first to study dividend growth and return predictability on a dataset with this length and quality. Golez and Koudijs (2018) use four centuries of data, but these authors need to combine different stock exchanges to obtain their series. We have the benefit of using homogeneous data of consistently higher quality. In turn, we can better determine the effect of the economic and institutional environment and assess other drivers of time-varying expected dividend growth rates and returns.

Second, compared to other countries, we have complete dividend information for the pre-World War I years. Since we have access to every stock that was ever listed, our dataset is free from survivorship bias and other important data flaws. Goetzmann, Ibbotson, and Peng (2001) use U.S. dividends and price series dating back to 1815. However, since their data are taken from newspapers, they may not include all listed stocks. More importantly, U.S. dividend data are noisy and incomplete for the nineteenth century. This can have important implications for return calculations. Our database is not subject to such data flaws, because of the availability of reliable first-hand data taken directly from the official archives of the BSE. This database is complemented with secondary sources that allow cross-checking to improve its internal consistency. The detailed, and exact, dividend data allows us to target dividend growth predictability rather than focusing on return predictability evidence. This enables us to provide an important contribution to the literature.

Finally, and most importantly, we show there is a relation between equity duration and return predictability. While other researchers focus more on the cross-section of expected returns (Chen, 2017; Weber, 2018), we focus on the aggregate stock market. Using the definition of equity duration of Golez and Koudijs (2015), we document a strong link between expected returns and elevated levels of equity duration. This could explain the reversal from dividend growth to return predictability in the post–World War II years (Golez and Koudijs, 2018; Rangvid et al., 2014).

1. Data

We introduce a new historical database of the BSE constructed by the SCOB research center of the University of Antwerp to the asset-pricing literature.[2] The BSE provides an alluring perspective. For a large part of our sample period, the BSE was one of the largest stock exchanges in the world in terms of market capitalization (Chambers and Dimson, 2016; Neymarck, 1911). Due to the progressive laws,[3] the BSE attracted considerably domestic and foreign capital (Chlepner, 1930). In 1902, Belgium was seventh in the world measured by stock ownership (Neymarck, 1911). At the height of the BSE's importance (in 1929), more than 900 Belgian stocks were listed (cf. figure 1).

In itself, Belgium is an interesting environment to study dividend growth and return predictability. It was one of the first countries in Europe to industrialize, even before France and Germany (Chlepner, 1930). Measured by industrial output per capita, Belgium ranked third in the world in 1913 (Madisson, 1995). Contrary to most other countries, where only a few industries were developed, the Belgian economy was relatively diversified, with important industries ranging from steel, telecommunications, railways, banking and electricity.

1.1. Data description

We have complete information on all listed stocks on end-of-month share prices, dividends, ex-dividend day, number of shares outstanding, stock and reverse splits, bonus stocks, subscription and attribution rights, and demerger activities. All corporate capital operations are important for correct return calculations. Sabbatucci (2015) highlights the importance of this information in the return predictability literature. To the best of our knowledge, we are not aware of any country that is able to determine stock returns in such a consistent way over such a long time period, for the full market, hence allowing precise calculation of price and total returns. Since we have all stocks ever listed on the BSE, survivorship bias is absent from the data.

The focus of this paper is the 1850–2015 period. To increase comparability with others, we report results for the pre–World War I period (1850–1913) and post–World War II period (1950–2015) separately. The middle period (1914–1949) is too short to draw strong conclusions. Furthermore, for the full sample, we exclude the 1914–1923 and 1940–1949 period, also referred to as the *war period*.[4] Firms did not pay (or hardly paid any) dividends during the World Wars, while paying accumulated dividends shortly after. For example, during the

[2] For a comprehensive description the data beyond this paper, we refer to Annaert et al., (2012) and Annaert, Buelens, and Deloof, (2015).
[3] For example, in 1873, the need for government permission to establish a limited liability company was abolished.
[4] To ensure that our results are not dependent on this choice, we include the results with the war period in appendix (cf. table A4).

World War II, the German occupiers intervened heavily in dividend payouts by limiting them to maximum of 6% of earnings (Baudhuin, 1958).

1.2. Dividend measurement

We construct a value-weighted (total) return index of Belgian common stocks listed on the BSE. We focus on the annual frequency to account for seasonality in dividend payments, which is a standard practice (Ang and Bekaert, 2007). We define dividends as the rolling-sum of dividend payments in the last 12 months, which is also a standard practice (Golez and Koudijs, 2018). Therefore, we make an assumption as to how to dividends received within the year are handled: reinvest them at the market return, at the risk-free rate not reinvested at all. This choice can influence the findings heavily (Chen, 2009; van Binsbergen & Koijen, 2010). Overall, the intuition is that when we apply a reinvestment assumption, dividends exhibit large return components, which clouds pure dividend growth rates and dividend yields. We apply dividends without reinvestment. We report evidence for dividends reinvested at the market rate of return in appendix B

In general, we define annual log dividend growth rates, log returns, and log dividend yields as follows:

$$dg_t = \log\left(\frac{D_{t+1}}{D_t}\right) = d_{t+1} - d_t, \tag{1}$$

$$r_t = \log\left(\frac{P_{t+1} + D_{t+1}}{P_t}\right), \tag{2}$$

$$dy_t = \log\left(\frac{D_t}{P_t}\right) = d_t - p_t, \tag{3}$$

where *D* is the sum of dividends paid over the preceding 12 months. Lower case letters denote logs.

1.3. Data summary

Table 1 reports summary statistics of dividend growth rates, returns, and dividend yields. We provide data in real terms. In the appendix B, we report summary statistics in nominal terms, conditional on economic regime and correlation matrices between variable innovations.

The main findings are as follows. First, we document a remarkable increase in average stock returns from the pre–World War I to the post–World War II years. Average real stock returns are, respectively, 8.6% and 9.9%. Similarly, average dividend growth is higher in the post–World War II relative to the pre–World I period (8.7% and 4.9%, respectively). These results are in line with previous evidence (Chen, 2009). Further, the correlation between dividend growth rates and returns is unstable. We find a positive correlation in the pre–World War I years and a negative correlation in the post–World War II years (respectively, 0.19 and -0.06).

Dividend yield varies around an average of 3.3%. In the most recent years, it has been falling, similar to other markets (Engsted and Pedersen, 2010). Moortgat et al. (2017) find that the introduction of new tech firms in the mid-1980s, which paid relatively low dividends, decreases dividend yield remarkably. The autocorrelation coefficients increase from the pre–World War I to post–World War II period (respectively, 0.68 to 0.77). More importantly, the autocorrelation coefficient is remarkably lower for the BSE relative to the U.S. (Chen, 2009).

Second, the increase in average returns from the pre–World War I to post–World War II years is accompanied by an increase in volatility (respectively, 9.7% and 19.8%). Although less pronounced, the volatility of dividend growth rates also increases from 14.5% to 17.3%. This result contradicts U.S. findings, where dividend growth volatility in the post–World War II period is lower than in the pre–World War II period (Chen, 2009). This can play a significant role if there is any differences between the Belgian and U.S. evidence.

2. Present-value framework

2.1. Log-linear approximation

We introduce the log-linear approximation of Campbell and Shiller (1988):

$$dy_t \approx -\kappa + \rho(dy_{t+1}) - dg_{t+1} + r_{t+1}, \quad (4)$$

where κ is a linearization constant and $\rho = 1/(1 + e^{E(dy)})$.

When we iterate this approximation forward, we get the following identity

$$dy_t \approx {}^{-\kappa}/_{1-\rho} + \sum_{j=1}^{m} \rho^{j-1} (r_{t+j}) - \sum_{j=1}^{m} \rho^{j-1} (dg_{t+j}), \quad (5)$$

where log returns and dividend growth rates are weighted by ρ^{j-1}, which is, by construction, less than 1.

If we assume no rational bubbles, there is a sound theoretical argument why dividend yields predict expected dividend growth rates and returns (Engsted et al., 2012). The intuition is that, with constant expected returns, an increase in expected dividends leads to an increase in stock price and to a decrease in dividend yield (which has a theoretical negative relation with expected dividend growth). With constant expected dividend growth, an increase in expected returns leads to a decrease in stock price and to an increase in dividend yields (which has a theoretical positive relation with expected). Therefore, dividend reinvestment biases dividend growth rates with a return component. Due to the offsetting relations between expected dividend growth, expected returns, and dividend yields, dividend growth predictability is hard to spot. In this article, we apply dividends without reinvestment.

2.2. Vector autoregressions

Time-varying dividend yields are explained by changes in expected dividend growth, expected returns, or the combination of these two. The correctly specified null hypothesis, therefore, must combine a null hypothesis of no dividend growth (return) predictability with the presence of return (dividend growth) predictability. We capture this dynamic via a restricted VAR(1) model of log dividend growth, log return, and log dividend yield:

$$r_{t+1} = \alpha^r + \beta^r dy_t + \varepsilon^r_{t+1}, \tag{6}$$

$$dg_{t+1} = \alpha^{dg} + \beta^{dg} dy_t + \varepsilon^{dg}_{t+1}, \tag{7}$$

$$dy_{t+1} = \alpha^{dy} + \phi dy_t + \varepsilon^{dy}_{t+1}, \tag{8}$$

When we substitute the regressions into the log-linear approximation and take the expectations, we get

$$\alpha^r + \beta^r dy_t = \alpha^{dg} + \beta^{dg} dy_t - \rho(\alpha^{dy} + \phi\, dy_t) - \kappa - dy_t, \tag{9}$$

which implies that that the coefficients in these three equations obey the following identity[5]

$$\beta^r = 1 - \rho\phi + \beta^{dg}, \tag{10}$$

where β^r, ϕ and β^{dg} are predictive coefficients for returns, dividend yields and dividend growth, respectively.

Since the regression coefficients sum to 1, we can infer them of one equation from the other two. This implies that if expected returns are not predictable, expected dividend growth rates are predictable to generate the observed variation in dividend yields.

When we rearrange equation 10 slightly, we get

$$\frac{\beta^r}{(1-\rho\phi)} - \frac{\beta^{dg}}{(1-\rho\phi)} = 1, \tag{11}$$

where the first term is referred to 'discount rate news' and the second term is referred to as 'cash-flow news'. These slope coefficients represent the fraction of variance due to changes in the two news components. They are also referred to as long-run coefficients (Cochrane, 2008). An advantage of the long-run coefficient is that we need not choose between dividend growth or return regressions, since they yield the same results.

2.3. Econometric issues

There are several reasons to exercise caution with this VAR(1) model. First, dividend yields are persistent and can exhibit near-unit root behavior (Park, 2010). This degree of dividend yield persistence is definitive for the transition of short-term into long-term predictability. Campbell and Yogo (2006) show that this near-unit root behavior could lead to explosive variances, and make statistical inference problematic. Moreover, if expected returns are also persistent, spurious regression can be a troublesome consequence (Ferson et al., 2003). Ang (2012) advocates using log dividend yields instead of dividend yield levels, since the former is less persistent and less subject to small-sample bias. This is verified in our data (not reported). Furthermore, the augmented

[5] The errors are linked according to $\varepsilon^r_{t+1} - \varepsilon^{dg}_{t+1} + \rho\varepsilon^{dy}_{t+1} \cong 0$.

Dickey-Fuller tests rejects the null hypothesis of unit roots for log dividend growth rates, returns and dividend yields at the 1% significance level (not reported).

Second, the instability of predictors across different time periods raises real issues of choosing an appropriate sample period for drawing statistical inference (Goyal and Welch, 2010). Moortgat et al. (2017) find there are three structural breaks in the BSE's dividend yield series: 1914, 1947, and 1986. Since two breaks are situated in the war period, we need to focus only on the structural break of 1986.

Lettau and Van Nieuwerburgh (2008) adjust dividend yields for structural breaks and show stronger evidence for return predictability. When we adjust dividend yields for the structural break of 1986, equation 11 is no longer valid.[6] Therefore, we split the post-World War II period into two parts: 1950–1986 and 1987–2015. In robustness test, we adjust the dividend yield for structural breaks, as in Lettau and Van Nieuwerburgh (2008).

Finally, Stambaugh (1999) shows that the "zero conditional expectation" assumption is clearly violated, since expected returns and dividend yields have price in the denominator. Similarly, expected dividend growth and dividend yield contain current dividends in the ratio. Small-sample estimations and inferences become more complicated as a consequence. This introduces an endogeneity bias in the regression coefficient and standard errors. Stambaugh (1999) and Nelson and Kim (1993) show that an upward bias in expected return regression can overstate return predictability evidence. Similarly, the downward bias in dividend growth regressions can understate dividend growth predictability evidence. Hence, we use statistical techniques that take the biases into account.

First, we use Hodrick (1992) standard errors to account for potential endogeneity biases in the residuals. Ang and Bekaert (2007) find that Hodrick (1992) correction improve the small-sample properties of *t*-statistics by summing the data to remove the moving average-structure in the errors. Ang (2012) finds that the traditional Newey-West (1987) corrections lead to size distortions, whereas Hodrick corrections do not. For this reason, we use Hodrick standard errors in this paper.

Second, we use Monte Carlo simulations to analyze the power of the asymptotic *t*-statistics for the regression coefficients based on the first-order VAR model. Following Cochrane (2008) and Maio and Santa-Clara (2015), we simulate the data under the null of no dividend growth (return) predictability combined with the presence of return (dividend growth) predictability. That is, the data-generating process is simulated for the hypothesis

[6] The Campbell-Shiller log-linear approximation holds exactly when dividend yields are constant. Whenever the dividend yield varies over time, there is an approximation error that depends on its persistence and volatility. The underlying assumption of the approximation is that dividend yields are a stationary process. However, in the case of structural breaks, this condition is clearly violated. For this reason, we can no longer depend on variance decompositions in the spirit of equation 11.

that dividend growth (return) predictability is the sole driver of dividend yield variation. More specifically, for the null hypothesis of no dividend growth predictability,[7] we have

$$\begin{bmatrix} r_{t+1} \\ dg_{t+1} \\ dy_{t+1} \end{bmatrix} = \begin{bmatrix} 1-\rho\phi \\ 0 \\ \phi \end{bmatrix} dy_t + \begin{bmatrix} \varepsilon^{r}_{t+1} \\ \varepsilon^{r}_{t+1}+\rho\varepsilon^{dy}_{t+1} \\ \varepsilon^{dy}_{t+1} \end{bmatrix}, \tag{12}$$

We simulate 50,000 data series that match the length of the respective time period. We assume that residuals are drawn from the random normal distribution, with their estimated error covariance matrix from the actual sample. The dividend yield is simulated to match the autocorrelation coefficient and standard deviation from the actual data. The first observation is drawn from an unconditional density, $dy_0 \sim N\left[0,\ \mathrm{var}\left(\varepsilon^{dy}_{t+1}\right)/(1-\phi^2)\right]$. Monte Carlo simulations yield the distribution of dividend growth and return coefficients, which are used to construct test statistics to evaluate the statistical significance of our empirical estimates.

In the spirit of Golez and Koudijs (2018), we report the long-run coefficient and corresponding *p*-values from Hodrick standard errors (using the delta method) and Monte Carlo simulations. Given the decompositions of equation 11, the coefficients sum to 1. However, since the coefficients are not orthogonal to each other, they can be larger than 100%. The sign of the estimated regression coefficient can be opposite to what is expected in some cases. If that were the case, 1 minus the simulated *p*-value gives the significance level to test the null hypothesis.

3. Regression evidence

3.1. In-sample evidence

We report the regression results in table 2. The main findings are summarized as follows. First, we find salient evidence of dividend growth predictability for the BSE. Dividend yield is a highly statistically and economically significant predictor for expected dividend growth rates.[8] As expected, the regression coefficients are always negative. We document the strongest evidence in the pre-World War 1 period, where 113% of dividend yield variation is explained by changes in expected dividend growth. In the post-World War II period, we document dividend growth predictability evidence, which contrasts previous U.S. conclusions (Golez and Koudijs, 2018). Nevertheless, the overall importance of cash-flow news in the variance decomposition decreases remarkably, with only 68% and 63% in the 1950-1986 and 1987-2015 period.

We should not understate this result. News related to expected cash flows is largely firm-specific and is more easily diversified away in a portfolio (Vuolteenaho, 2002). An increase in the number of stock listings should,

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[7] The null hypothesis of no return predictability then becomes $\begin{bmatrix} r_{t+1} \\ dg_{t+1} \\ dy_{t+1} \end{bmatrix} = \begin{bmatrix} 0 \\ \rho\phi-1 \\ \phi \end{bmatrix} dy_t + \begin{bmatrix} \varepsilon^{d}_{t+1}-\rho\varepsilon^{dy}_{t+1} \\ \varepsilon^{dg}_{t+1} \\ \varepsilon^{dy}_{t+1} \end{bmatrix}$.

[8] In appendix, we include the results with the war period. This yields the same qualitative conclusions (cf. table A4).

therefore, decrease the importance of expected dividend growth rates at the market level. In the pre-World War I period, where the number of stocks increases noticeably, we report strong evidence of dividend growth predictability. In turn, this could explain the evidence of dividend growth predictability in the post-World War II period. However, since the number stock listings in the United States decrease as well, the question remains why there a disconnect between U.S. and Belgian evidence.

Second, the return predictability evidence is a tale of two periods. In the pre–World War I period, there is no evidence of return predictability (only 18% of the variation in dividend yields is explained by expected return variation). Moreover, the implied coefficient is both economically and statistically insignificant and even has the wrong sign. The statistical insignificance is not unique, since it is similar to previous evidence (Chen, 2009; Golez and Koudijs, 2018).

In the post–World War II period, we see that in the first subperiod, there is no return predictability evidence. The implied coefficient is statistically insignificant (0.11 with a simulated *p*-value of 0.29). This contrasts with U.S. evidence (Chen, 2009). In the second subperiod, dividend yields predict expected returns. Discount rate news explains, on average, 37% of the dividend yield variation (this is statistically significant). In other words, there is only evidence of return predictability in the 1987-2015 period. This conclusion is robust for additional methods. The question, thus, remains why there is only a strong presence of return predictability in the most recent period.

3.2. Out-of-sample methods

An approach to address parameter instability is through out-of-sample regressions. This type of regression is used to check whether in-sample evidence holds. The intuition is that parameter instability leads to poor out-of-sample evidence, since in-sample regressions do not correctly capture coefficient dynamics. Hence, these regressions are the most important source of criticisms against predictability results (Goyal and Welch, 2010).

3.2.1. Test statistics

The idea behind out-of-sample regressions is straightforward. We compare two models. The first model uses only a historical sample average (and is referred to as a naïve model). It is the natural benchmark for out-of-sample models. The second model adds the dividend yields as a predictor (and is referred to as the prediction model). Intuitively, if the dividend yield has some predictive ability, the second model should outperform the first model. In the analysis, we apply expected dividend growth and returns as the dependent variable. More specifically,

$$y_t = \beta_{1,0} + \varepsilon_{1,t}, \tag{13}$$

$$y_t = \beta_{2,0} + \beta_{2,1}\, dy_{t-1} + \varepsilon_{2,t}, \tag{14}$$

where y_t is the expected dividend growth rate or expected return.

Each time an out-of-sample-prediction is made, we compute the forecast errors as follows

$$u_{1,t+1} = y_{t+1} - \hat{\beta}_{1,0}, \tag{15}$$

$$u_{2,t+1} = y_{t+1} - (\hat{\beta}_{2,0} + \hat{\beta}_{2,1}\, dy_t), \tag{16}$$

where $u_{1,t+1}$ and $u_{2,t+1}$ are the prediction errors.

To compare both models, their prediction residuals are evaluated via three test statistics. If the results of the first model are better, dividend yields do not add predictive power. We report three test statistics to compare these models: Theil's *U*, *MSE-F* statistic, and ENC test.

As a starting point, we define the sum of squared errors (SSE) as

$$SSE_i = \sum_{t=R}^{T-1} \left(u_{j,t+1}\right)^2, \qquad with\ j = 1,2, \tag{17}$$

where *T* is total sample size and *R* the rolling window, which is 20 years in our study.

First, we apply Theil's *U* metric, calculated as $\sqrt{SSE_2}/\sqrt{SSE_1}$. The test statistic is a relative accuracy statistic, which compares forecasted results with forecasting results with minimal historical data. The Theil's *U* statistic favors the prediction models whenever this statistic is less than 1. Overall, the lower this value, the better is the out-of-sample performance of dividend yields.

A similar measured is the out-of-sample R-squared (Campbell and Thompson, 2008). If the out-of-sample R-squared is positive, predictive regression have lower average prediction error than a model with the historical average.

Second, the *MSE-F*-statistic is based on the difference between the SSE,

$$MSE - F = (T - R)\, \frac{SSE_1 - SSE_2}{SSE_2}, \tag{18}$$

The null hypothesis of the *MSE-F* test is that a constant expected dividend growth (return) model has a mean-squared predictive error that is less than, or equal to, that of time-varying expected dividend growth (return) models. The alternative hypothesis is that the time-varying expected model has a lower mean-squared error. Overall, the higher the *MSE-F*, the higher the predictive benefits of dividend yield.

Finally, the ENC test is an encompassing test, which is based on the covariance between the prediction errors of the naïve model and difference between prediction errors of both models (Clark and McCracken, 2001),

$$ENC = (T - R)\frac{\bar{c}}{SSE_2}, \quad (19)$$

where $\bar{c} = \sum_{t=R}^{T-1} u_{1,t+1}(u_{1,t+1} - u_{2,t+1})$.

The null hypothesis of these encompassing tests is that the naïve model encompasses all predictability, which cannot be further improved by conditioning on the dividend yields. In fact, if the forecasts from the constant expected dividend growth (return) model do not encompass those from the time-varying expected dividend growth (return) model, then the latter has information that is useful for forecasting out-of-sample. The higher this ratio, the higher the predictive benefits.

3.2.2. Bootstrapping method

To assess the significance of these test statistics, we do not rely on their asymptotic distributions. In turn, we report simulated *p*-values (Goyal and Welch, 2010). More specifically, we estimate the predictive regressions from the original data, and store the residuals for resampling. Next, we use the original data while imposing the null of no predictability. The resulting residuals are stored for later use to generate bootstrap data under this null. We construct the test statistics on each of 50,000 artificial samples, the empirical *p*-values are then the fraction of simulated samples that produce the specific test statistics as large (or larger) than the one we find in the data. The benefit of this method is that it addresses the persistence of the dividend yields and the contemporaneous correlations between all the variables (Chen, 2009).

3.2.3. Out-of-sample evidence

We report the results in Table 3. The key findings are summarized as follows. First, all test statistics point to the out-of-sample forecasting ability of the dividend yield for expected growth (e.g. Theil's *U* has values lower than 1 in the pre– and post–World War II period). For all subperiods, the out-of-sample R-squared are greater than 0%. Therefore, this evidence validates the in-sample evidence. Dividend growth predictability is a salient characteristic of the BSE.

Second, when adjusting the dividend yield for the structural break, Theil's *U* and *MSE-F* point to poor out-of-sample evidence. However, the ENC statistic and out-of-sample R-squared provide counterevidence, where dividend yield does not have forecasting ability for expected returns. Given the mixed findings, we conclude that there is only modest out-of-sample findings from the BSE dividend yield, which confirms previous results (Goyal and Welch, 2010).

4. Discussion

Thus far, we have two important results in this paper.[9] First, we document that dividend growth predictability is a robust feature for the BSE. Second, we find return predictability evidence in the period 1987-2015, while we do not see any evidence in the period pre-1987. In this section, we study the findings in-depth and provide explanations.

4.1. Dividend smoothing

A natural question is why dividend growth is more predictable in Belgium compared to other countries (Golez and Koudijs, 2018). There is evidence that dividend policy of European firms differs from the U.S. (Fama and French, 2001). First, the fraction of dividend paying firms has not dropped as dramatically in Belgium relative to the U.S. (cf. Figure 2). Second, share repurchases have been an essential part of U.S. dividend payout policy since 1982, while this only started in Europe in the 1990s (Eije and Megginson, 2008). In fact, it is documented that there are limited stock repurchases prior to 2000 in Belgium.[10] Moreover, the real value of repurchases were remarkably lower than for other countries. We thus look for alternative explanations for the disconnect with previous U.S. predictability evidence (Chen, 2009).

Chen (2009) shows that dividend growth predictability disappears in the post–World War II period. This result is explained by an increased dividend smoothing (Chen et al., 2012), which, in turn, is defined as low dividend volatility relative to earnings volatility. In fact, dividend payout is not solely determined by the firm's earnings but also by other effects, such as the firm's past dividend payouts. Hence, dividends do not solely reflect cash flow variation, which can bias dividend growth rates and make dividend growth predictability harder to find.

4.1.1. Preliminary evidence

To examine dividend smoothing, we first examine the proportion of firms that changed their dividends in any given year. In the spirit of Turner, Ye, and Zhan (2013), we report the percentage of companies that changed their dividend policy (cf. Figure 3). In the case of dividend smoothing, we expect that changes in the amount of real dividends paid is small, hence, the percentage of firms that alter their dividend policy is small. We find that, on average, more than 50% of firms changed the real amount of dividends paid in a given year in entire sample period. This ratio, on average, even increases from the pre-World War 1 to post-World War II periods, respectively 48.1% to 55.8%.

[9] The results are robust when we use data from Datastream to incorporate earnings information. However, there are two issues involved. First, there is only data in Datastream as of 1973. The time period is therefore limited. Rangvid et al. (2014) apply this data and find similar results for Belgium as do we. Second, the data is only available for a limited number of stocks (93 stocks relative to more than 200 stocks in the SCOB database). This could lead to survivorship bias (Goetzmann and Jorion, 1995). Nevertheless, even with these two issues, are findings are robust (cf. table A19).

[10] The SCOB database allows us to identify both the stocks for which the number of shares outstanding declines and the reasons for this. In 159 cases, we see a declining number of shares. Only 20 of these cases involve a share repurchase, the first one occurring only in 2007. The majority of cases involved a reverse split. Moreover, Moortgat et al. (2017) find no change in dividend policy in the pre-World War II and post-World War II periods, hence, it seems unlikely that share repurchases are of any importance on the BSE.

Additional evidence of a lack of dividend smoothing is found in an AR(1) model of dividend growth rates. The intuition is that, in the case of dividend smoothing, dividend growth is predictable through its own lag(s). This means that the real amount of dividends paid by companies does not change due to earnings changes; rather, they are captured through economic mechanisms. Although this model is simplistic, it provides an indication. We document that the first lags of dividend growth is not statistically significant in forecasting future dividend growth, in contrast to Chen et al. (2012).

4.1.2. Dividend policy model

To test the dividend smoothing hypothesis, we use a model in the spirit of Garrett and Priestley (2000),

$$dg_{t+1} = \alpha + \beta_1 \, r_t + \beta_2 \, \widetilde{dy}_t + \varepsilon_{t+1}, \tag{20}$$

where $\widetilde{dy}$ is adjusted dividend yield, which is defined as $\widetilde{dy} = \begin{cases} dp_t - \overline{dp_1} \; for \; t = 1, \dots, \tau \\ dp_t - \overline{dp_2} \; for \; t = \tau + 1, \dots., T \end{cases}$ with τ as the structural break date.

This reduced-form model describes the short-term dividend dynamics and long-term convergence of current dividends to the steady-state target. The model tests how dividend payout responds to permanent earnings changes. This model does not require accounting data, but rather uses stock returns as the proxy for earnings. Since we lack accounting data for the majority of the sample period, this is one convenient way to circumvent this problem.

In eq. 20, β_1 captures the short-run effects when managers change dividends in response to an unanticipated permanent earnings changes, β_2 measures the long-run average speed of convergence of the current payout ratio to its long-run steady-state target, and α is a constant. Permanent earnings are defined as the aggregate stock price times expected real rate of return. This implies that stock return is equal to the percentage change in the manager's assessment of permanent earnings (Marsh and Merton, 1987). If β_1 is statistically significant dividend growth depend on short-term earnings changes. In other words, there is evidence against dividend smoothing.

The evidence is reported in Table 5. We show that the responses to earnings changes is statistically significant in every subperiod. Dividends are driven mostly by cash flow changes, and not by other effects (the regression coefficients are 0.25 and 0.37, respectively). Also, the sign is as expected: an increase in earnings leads to an increase in future dividend growth. In addition, the economic significance in the post–World War II period is larger than in the pre–World War I period, and contrasts with U.S. evidence (Chen et al., 2012). In conclusion, Belgian firms did not smoothen dividends, particularly in the post–World War II period.

The constant of our models is also statistically significant, similar to Garrett and Priestley (2000). The negative constant indicates that managers were not more reluctant to cut dividends than to raise them, in contrast to the premise of classic dividend policy models. Previous evidence shows that non-US companies appear to be less concerned about dividend cuts and thus alter dividend policy more frequently than the U.S. counterparts (Andres et al., 2009).

As an additional robustness tests, we select subsamples that are less likely to be able to smooth their dividend payments. The intuition is that small firms are less diversified and in a more difficult position with respect to smoothing dividends (Leary & Michaely, 2011). We use size-sorted portfolios to test the dividend smoothing hypothesis. Each January, we sort stocks by the market capitalization, which is computed in December of the preceding year by multiplying the ending prices by the number of shares outstanding. As in Fama and French (2008), we use breakpoints to separate the micro-caps from small-caps at the 20th percentile, and small-caps from large-caps at the 50th percentile of market capitalization of the BSE. Our analysis is done on both small- and large-caps. As a justification, Annaert and Mensah (2014) show that micro-caps account for less than 4% of total stock market capitalization in the pre–World War I period.

Similar to the aggregate market, we report results on small-cap and large-cap portfolios (panels B and C). The evidence further strengthens our conclusions. In each period, the response to permanent earnings changes is statistically significant (in the post–World War II period, regression coefficients are 0.32 and 0.77 for large-cap and small-cap portfolios, respectively). The economic significance confirms the conclusions by Leary and Michaely (2011) that the magnitude for small-cap stocks is larger than for large-cap stocks. Therefore, small-caps smooth dividends less than large-caps.

Our findings complement Moortgat et al. (2017), who conclude that dividend policy for Belgian firms is similar in the pre–World War I and post–World War II period. Moreover, the evidence add to the growing non-U.S. results against dividend smoothing (i.e. Andres et al., 2009; Dewenter and Warther, 1998). More importantly, our findings can serve as an explanation for the presence of dividend growth predictability in the post–World War II years. An potential explanation of the difference with U.S. dividend smoothing evidence is that Belgian companies are less characterized by concentrated ownership and classical tax systems (Pattenden and Twite, 2008).

4.2. Equity duration

We document that only in the 1987–2015 period is there modest evidence for return predictability. Discount rate news accounts for, on average, 37% of the variation in dividend yield. The question remains why discount rate became more influential in the post-1986 period.

A recent strand in the asset-pricing literature targets “equity duration” (Chen, 2017; Golez and Koudijs, 2015; Weber, 2018). Equity duration, borrowed from the fixed-income literature, refers to two main ideas: average time over which cash-flows accrue and sensitivity of asset prices to changes in yield (which are discount rates for equities). For bonds, it makes sense to combine the two concepts in a single phrase. For stocks, this is not as straightforward, since they do not have a finite horizon and cash flows are not known in advance.

When equity duration increases, the stream of future cash-flows is tilted toward the future, where the impact of a change in discount rate is relatively high. Therefore, firms with high future dividend growth are generally characterized as high-duration stocks (referred to as growth stocks). Similarly, stocks with low future dividend growth rates are low-duration stocks. This paper does not rely directly on a cross-sectional framework as in Weber (2018), but uses a time-series perspective.

We introduce a proxy for duration following Golez and Koudijs (2015). In particular, we calculate the fraction of the price that is accounted for by the present value of future dividends. We use a forward time window of 10 years as the baseline case (this variable works at frequencies from 5 to 20 years; see appendix B). We take 1 minus this fraction as the proxy for duration (for details, see Golez and Koudijs (2015)), that is,

$$dur_t = 1 - dy_t \sum_{n=1}^{10} \left(\frac{1+\bar{g}}{1+\bar{r}} \right)^n , \tag{21}$$

where $\bar{g}$ is average per-period dividend growth and $\bar{r}$ is average per-period market return (cf. Figure 4).

We capture the relationship between equity duration and return predictability in a switching OLS regression. In this framework, we disentangle the impact of a low- and high-duration regimes on expected returns. Given the positive relation between equity duration and discount rate news, we target return predictability,

$$r_{t+1} = \left(\alpha + \beta^H \widetilde{dy_t}\right) I_t + \left(\alpha + \beta^L \widetilde{dy_t}\right)(1 - I_t) + \varepsilon^r_{t+1}, \tag{22}$$

where I_t is a dummy variable that equals 1 if the current equity duration is above its long-run average, and 0 otherwise. We define this long-run average as the average equity duration in the specific period. For example, we calculate the average in the post–World War II years as the average of the 1950–2015 period and compare the equity duration of every single year to the total average. The same method applies to the pre–World War I period.

We report the results in Table 5. Our main findings are summarized as follows. First, in the post–World War II period, there is only a positive relation between equity duration and expected returns when we condition on duration regimes. That is, when the current equity duration is above its overall average, there is evidence of return predictability. In turn, when we are in a low-duration regime, there is no return predictability evidence. This conclusion validates the null hypothesis that discount rate news is more important when equity duration is high relative to cash flow news. This result also presents itself in the variance decomposition (cf. Table 2), where the news related to expected returns explains a higher average percentage of dividend yield variation in the most recent period. When we use size-sorted portfolios, we reach the same qualitative conclusion. We therefore conclude that there is an important relationship between high-duration regimes and discount rate news.

Second, in the pre–World War I period, there is a lack of return predictability evidence. When we condition on equity duration regimes, we do not find any evidence of forecastable expected returns. This confirms the results of the main analysis. The average equity duration equals 0.68 in the pre-World War I period compared to 0.89 in the post-World War II period. Overall, this result strengthens the evidence of the relation between equity duration and expected returns.

4.3. Dividend yield adjustments

4.3.1. Changing index composition

When equity duration is high, the change in discount rate news is more influential than changes in cash-flow news. Another way to express this concept is to state that aggregate market behaves more like growth stocks. Moortgat et al. (2017) find an increase in IPOs the mid-1980s. In the 1946–1980 period, 2.7 firms per year on average issued an IPO. After 1980, this number increased to more than 6 firms per year. The IPO wave of the mid-1980s introduced a relatively high number of growth firms, which were less likely to pay dividends. This lowered the aggregate dividend yield. The increase in equity duration can be attributed to the changing index composition. Jank (2015) shows that these changes can distort inferences heavily. Therefore, he proposes to change dividends yield continuously to account for changes in the population of firms. We follow this method by adjusted the dividend yield to the changing index composition, that is

$$\overline{dy}_t = \overline{dy}_0 + \sum_{i=1}^{t} \Delta\overline{dy}_t^e, \tag{23}$$

where $\overline{dy}_0$ is dividend yield at time zero and $\Delta\overline{dy}_t^e$ is dividend yield of entering or exiting firms.

We only consider firms that are continuously listed in the previous year and current year and take differences with the dividend yield of all firms listed in the current year. This is attributed to the composition change, as in Jank (2015). Similar to the literature, we focus on the post-World War II period, since this period did see a dramatic decrease in the number of stocks (cf. Figure 1).

We report the results in Table 6 (panel A). Relative to previous analyses, we run univariate regressions (similar to Jank, 2015)). Our results are summarized as follows. First, dividend yield is highly statistically significant in predicting expected dividend growth. An adjusted dividend yield does not change the qualitative conclusions.

In every period, we find dividend growth predictability evidence. This result, therefore, remains stable in the regression model.

Second, return predictability evidence remains salient when we adjust dividend yields for the changing index composition. More specifically, we document the positive significant relationship between dividend yield and expected returns. In the pre-World War 1 years, there is no evidence of return predictability. This result, thus, is important, since the number of stock listings decrease significantly after 1929, the height of the importance of the BSE. As already pointed out, there is a relatively high number of new, tech firms that were introduced in the mid-1980s. This remarkable change in market index explains part of the increase in discount rate news, in the post-World War II period.

4.3.2. Cyclically-adjusted dividend yield

To ascertain that the findings are not driven by the exclusion of the *war period*, we introduce an adjustment of dividend yield. In the spirit of Campbell and Shiller (1998), we construct a cyclically-adjusted dividend yield (*cady*),

$$cady_t = \log\left(\frac{[(D_t + D_{t-1} + \cdots + D_{t-10})/10]}{P_t}\right), \tag{24}$$

This adjustment is necessary since dividend payout is highly affected by both World War I and World War II. For example, during World War II, the German occupiers limited dividends to the maximum of 6% of earnings (Baudhuin, 1958). This leads to elevated levels of dividend growth in the years following the World Wars. The cyclically-adjusted dividend yield, as cyclically-adjusted price-earnings (CAPE), suppresses these outlier years.

We report the results in Table 6 (panel B). Similar to the analysis with a changing index composition, we focus on univariate regressions. In this regression, we include the years 1914-1923 and 1940-1949. The results are summarized as follows. First, dividend growth predictability remains a robust characteristic of the BSE. In the pre-World War I period, however, economic and statistical significance decreases remarkably relative to the univariate regressions with the regular dividend yield as a predictor (cf. table A4). Nevertheless, in pre-World War I and post-World War II period, the cyclically-adjusted dividend yield is significant in forecasting dividend growth (at the 1% significance level). In the overall sample, *cady* is significant at the 10% significance level.

Second, there is periodic evidence of return predictability. In the post-World War II period, *cady* is significant at forecasting expected returns. Similar to the index composition adjustment, in the pre-World War I period, there is no evidence of return predictability. In turn, there is some significant evidence for the overall sample, however, it is only significant at the 10% significance level. Nevertheless, we echo the conclusion by Campbell and Shiller (1998) that adjusting the predictor for business cycles improves its predicting abilities for expected returns. We conclude that there is period return predictability evidence, only in the post-World War II period.

5. Conclusion

Do stock prices move because of news related to expected cash flows or because of news related to expected returns? This paper extends standard analysis in several ways. First, we add more than 100 years of data to the literature. Second, we use high quality dividend information for every stock ever listed on the BSE, which eliminates potential data biases. This enables us to focus more on dividend growth predictability with a pure dividend metric. Finally, and more importantly, we provide a formal framework to test the impact of duration of the aggregate market on return predictability.

In sum, we reestablish the importance of cash flow variation as the driver of asset price fluctuations. We find the strongest evidence of dividend growth predictability in the pre–World War I period, although there is also evidence in the post–World War II period. This result is important, for instance, for equity valuation and asset allocation. More importantly, conclusions are stable when we sort stocks on firm characteristics, focus on specific industries, introduce additional predictors, and apply other statistical models. The evidence is also robust when we adjust the dividend yield for a structural break and for a changing index composition.

There are, at least, three reasons for the contrast with previous U.S. results (Chen, 2009). First, the propensity to pay dividends of Belgian firms has not dropped as significantly compared to other countries. Second, stock repurchases are not an important part of the dividend payout policy for Belgian companies. Finally, and most importantly, dividend smoothing did not occur on an aggregate level on the BSE. When we target subsamples that are less likely to smoothen dividends, these conclusions hold. Our evidence adds to the growing research on the lack dividend smoothing for non-US firms and aligns with the mounting evidence that non-US firms are less concerned about dividend cuts and alter dividend policy more frequently than their US counterparts.

We find return predictability evidence only in the 1987–2015 period. When we adjust the dividend yields for the change in index composition or business cycles, we find return predictability evidence in the entire post-World War II period. The increase in importance of discount rate news is explained by an increase in equity duration, followed by the introduced of growth firms in the mid-1980s. When we condition on the duration regimes, we document a positive relationship between expected returns and equity duration, for high equity duration regimes. This conclusion holds if we apply size-sorted portfolios. With this result, we contribute to the growing evidence on the equity term structure.

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Figures

Figure 1: Number of listed stocks

This figure plots the number of Belgian listed stocks on the BSE for the 1850–2015 period. The data are on an annual basis. A comprehensive description of these stocks is found in Annaert et al. (2012) and Annaert, Buelens, & Deloof (2015).

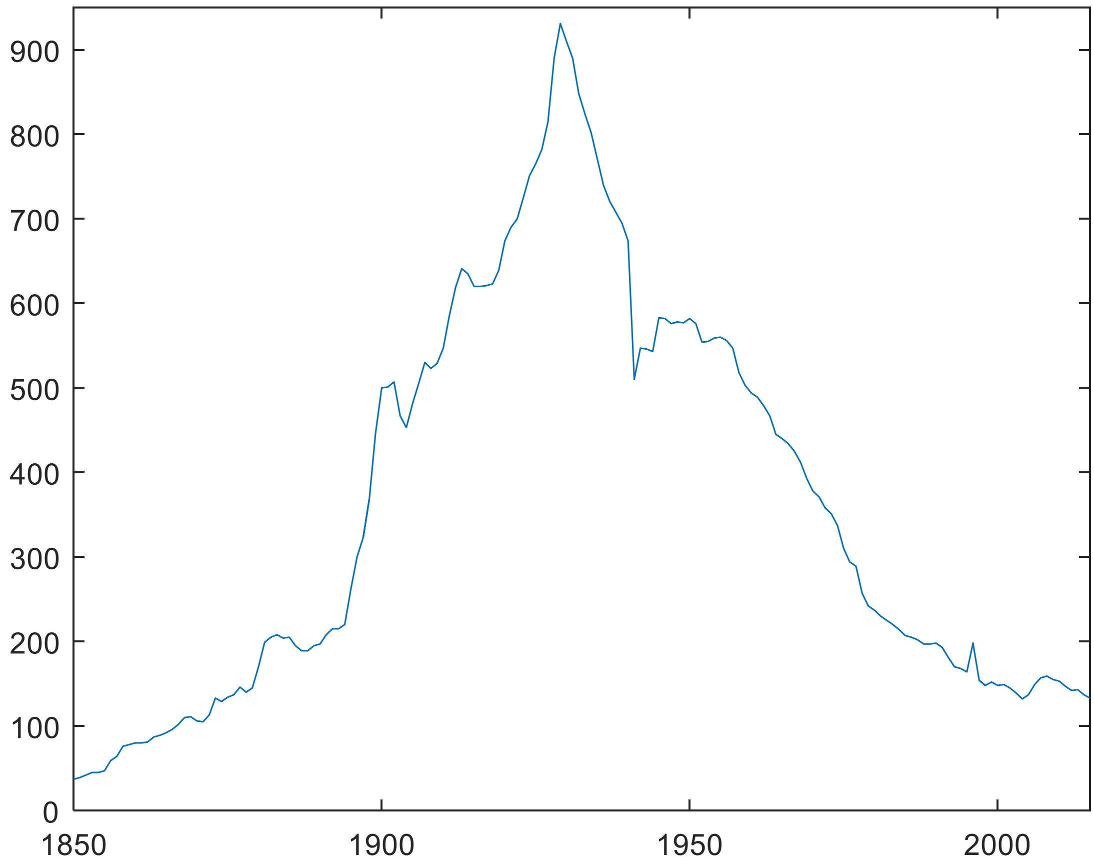


Figure 2: Propensity to pay

This figure plots the percentage of Belgian stocks that distributed dividends, referred to as the propensity-to-pay. It covers the 1850–2015 period, including the war years. Data are on an annual basis.

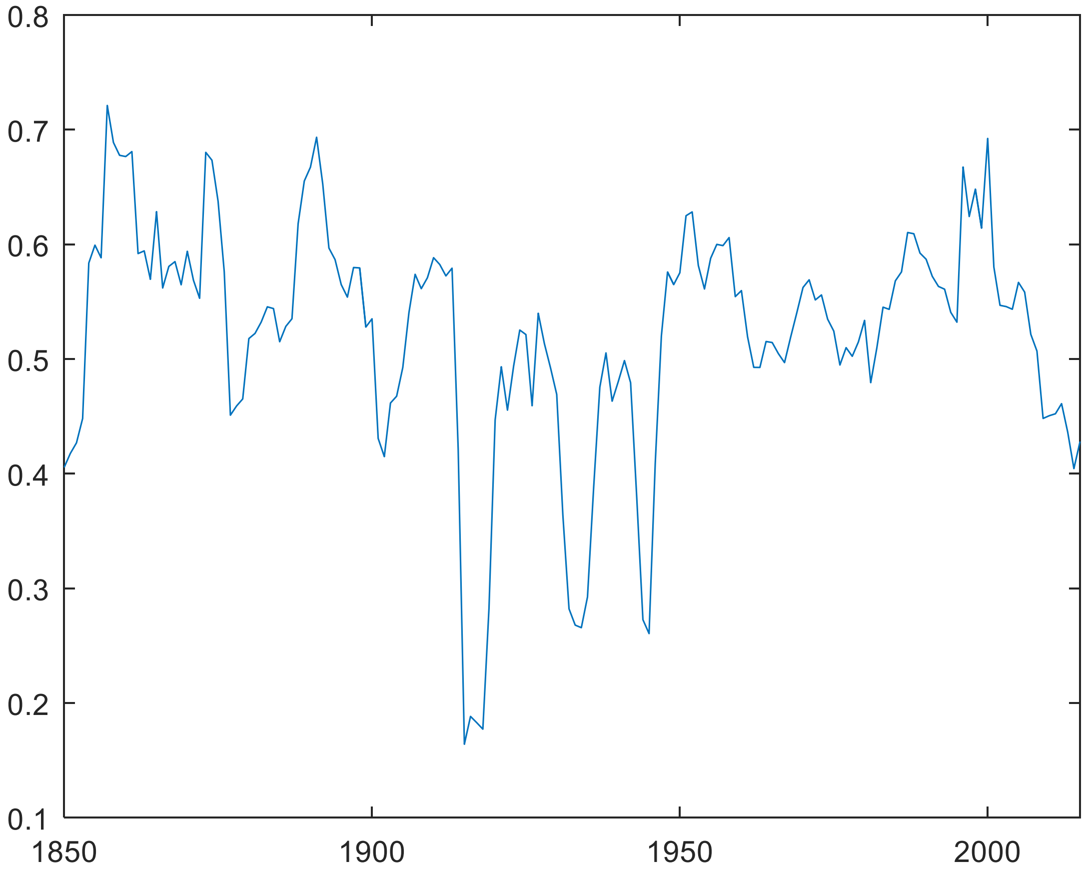


Figure 3: Dividend policy changes

This figure plots the percentage of Belgian firms that change their dividend policy at least once during a year. It covers the 1850–2015 period, including the war years. Data are on an annual basis.

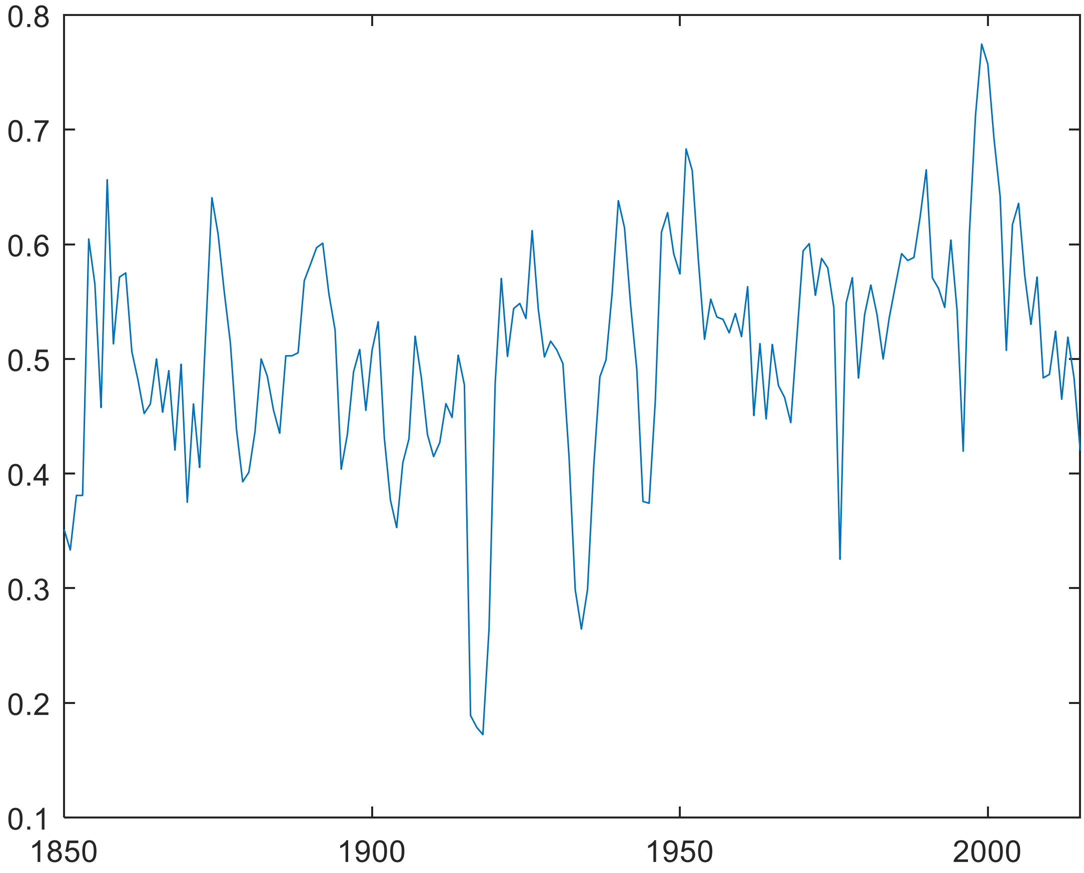
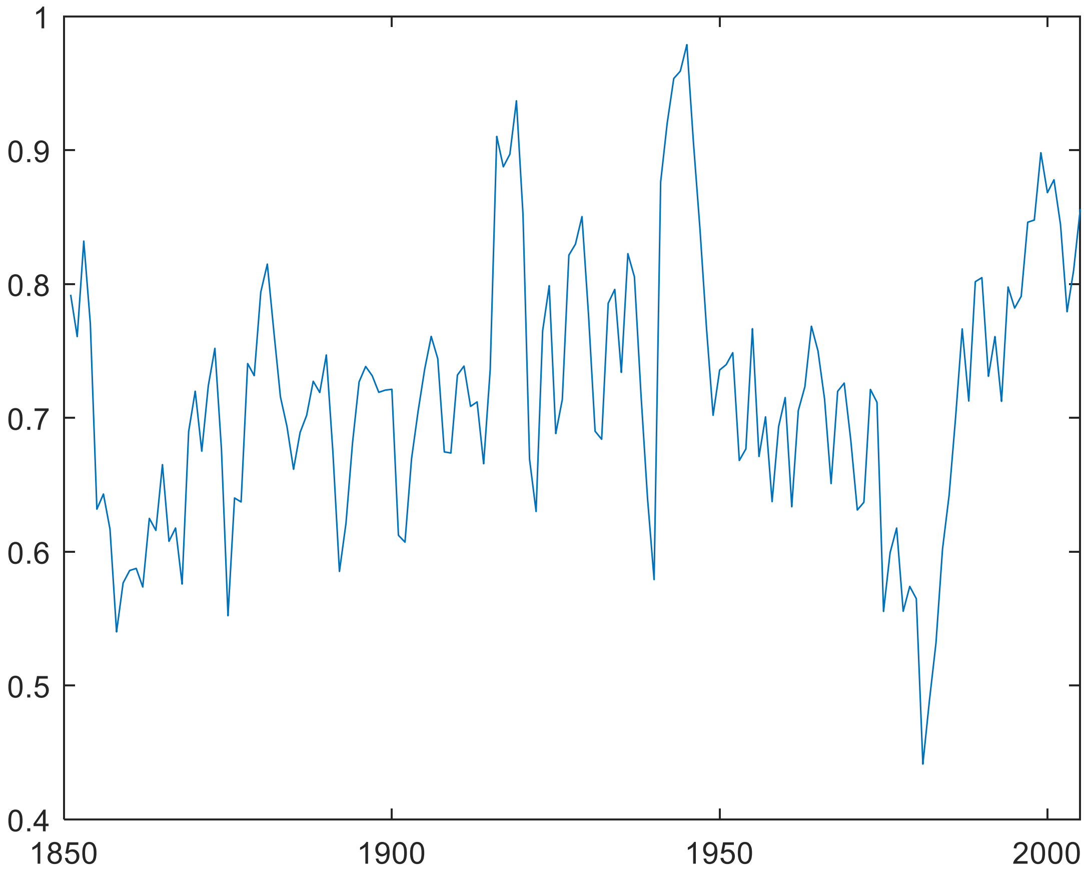


Figure 4: Equity duration

This figure plots our proxy for equity duration, which is defined as $dur_t = 1 - dy_t \sum_{n=1}^{10} \left(\frac{1+\bar{g}}{1+\bar{r}}\right)^n$ where $\bar{g}$ is per-period average dividend growth and $\bar{r}$ is per-period average discount rate. We use a 10-year window to calculate the averages. The figure covers the 1850–2015 period.



Tables

Table 1: Summary statistics

	1850-2015			1850-1913			1950-2015		
Variable	Mean	Std.	Ser. corr.	Mean	Std.	Ser. corr.	Mean	Std.	Ser. corr.
dg_t	4.79	16.42	0.06	4.84	14.52	0.22	5.49	17.26	-0.13
r_t	8.91	17.73	0.10	8.61	11.21	0.25	9.98	20.35	--0.02
dy_t	3.31	33.23	0.74	3.20	21.93	0.68	3.39	39.58	0.77
Variable	Correlation			Correlation			Correlation		
	dg_t	r_t	dy_t	dg_t	r_t	dy_t	dg_t	r_t	dy_t
dg_t	1.00			1.00			1.00		
r_t	0.07	1.00		0.16	1.00		-0.03	1.00	
dy_t	-0.06	-0.48	1.00	-0.04	-0.55	1.00	-0.03	-0.45	1.00

This table reports summary statistics of all stocks listed on the BSE. The mean, standard deviation ("std.") and first-order serial correlation ("ser. corr.") of real log dividend growth rates (*dg*), real log returns (*r*) and log dividend yield (*dy*) are computed. Variables are calculated assuming no reinvestment of dividends within the year. All numbers are in percentages or the log of the percentage for dividend yields. The table also reports correlations among log dividend growth rates, log returns, and log dividend yields. We exclude the periods 1914–1923 and 1940–1949 for the 1850-2015 period.

Table 2: Dividend growth and return predictability

	1850-1913	1950-1986	1987-2015
Panel A: Dividend growth			
dp_t	-0.41	-0.24	-0.48
Implied coefficient	-0.41	-0.24	-0.47
p-value (Hodrick)	(0.00)	(0.05)	(0.00)
p-value (sim. direct)	(0.00)	(0.02)	(0.00)
Long-run coefficient	-1.18	-0.68	-0.63
p-value (delta method)	(0.00)	(0.03)	(0.00)
p-value (sim. direct)	(0.00)	(0.01)	(0.00)
Panel B: Returns			
dp_t	-0.06	0.12	0.29
Implied coefficient	-0.06	0.11	0.29
p-value (Hodrick)	(0.35)	(0.29)	(0.01)
p-value (sim. direct)	(0.12)	(0.29)	(0.05)
Long-run coefficient	-0.18	0.33	0.37
p-value (delta method)	(0.40)	(0.26)	(0.01)
p-value (sim. direct)	(0.12)	(0.22)	(0.04)

This table reports slope coefficients of annual value-weighted real log dividend growth rates, real log returns, and real log adjusted dividend yields (*dy*) on lagged log adjusted dividend yields. Variables are calculated assuming no reinvestment of dividends within the year. The implied coefficients are calculated via the identity: $\rho\phi - \beta^{dg} + \beta^{r} = 1$ with $\rho = 1/((1 + exp(dy))$. The *p*-values are based on the Hodrick (1992) corrections, *p*-value (Hodrick) or Monte Carlo simulations, *p*-value (sim. direct). The long-run coefficient is implied from $\frac{\beta^{r}}{(1-\rho\phi)}$ and $\frac{\beta^{dg}}{(1-\rho\phi)}$ for, respectively, the dividend growth and return regressions. The *p*-values are based on the delta method, *p*-value (delta method) or Monte Carlo simulations, *p*-value (sim. direct). All regressions include a constant.

Table 3: Out-of-sample regression

	1850-1913	1950-2015	1850-2015
Panel A: Dividend growth rates			
$Theil's\ U$	0.80***	0.97***	0.91***
	(0.00)	(0.02)	(0.00)
$MSEF$	0.25***	0.03***	0.10***
	(0.00)	(0.02)	(0.00)
ENC	2.56***	0.38*	2.78***
	(0.00)	(0.07)	(0.00)
R^2_{OOS}	36.29%	2.08%	9.24%
Panel B: Returns			
$Theil's\ U$	1.02	0.99*	1.00
	(0.75)	(0.07)	(0.13)
$MSEF$	-0.02	0.01*	0.00
	(0.74)	(0.07)	(0.13)
ENC	-0.05	0.13	0.15
	(0.63)	(0.18)	(0.27)
R^2_{OOS}	-4.55%	-0.65%	-0.94%

This table reports four metrics to measure the out-of-sample rolling regressions. For expected dividend growth rate and expected returns, we report Theil's U, MSE-F statistic, and ENC statistic. Bootstrapped *p*-values are reported in parentheses. We exclude the periods 1914–1923 and 1940–1949 for the 1850–2015 period. The rolling window is 20 years.

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

Table 4: Dividend behavior model

	α_0	β_1	β_2	$\bar{R}^2$
Panel A: Aggregate market				
1850-1913	-1.06***	0.25	-0.34***	39.33%
	(-4.22)	(1.57)	(-4.24)	
1950-2015	-0.41***	0.37***	-0.13***	36.74%
	(-3.19)	(2.43)	(-3.20)	
1850-2015	-0.53***	0.36***	-0.16***	37.63%
	(-4.66)	(3.59)	(-4.67)	
Panel B: Large caps				
1850-1913	-1.14***	0.44***	-0.36***	45.12%
	(-3.58)	(2.31)	(-3.50)	
1950-2015	0.03	0.32***	-0.23***	35.82%
	(1.57)	(2.68)	(-3.07)	
1850-2015	-0.49***	0.44***	-0.16***	40.66%
	(-4.08)	(4.57)	(-4.16)	
Panel C: Small caps				
1850-1913	-2.22***	0.92***	-0.58***	35.36%
	(-5.15)	(1.96)	(-5.06)	
1950-2015	-0.15***	0.77***	-0.86***	43.38%
	(-1.95)	(2.23)	(-7.60)	
1850-2015	-1.87***	0.28	-0.46***	25.23%
	(-6.16)	(1.06)	(-6.10)	

This table reports slope coefficients from the dividend policy model with real log dividend growth rate (*dg*), real log total return (*r*), and the residuals (ε). Variables are calculated assuming no reinvestment of dividends within the year. *T*-statistics are reported in parentheses and are calculated using Hodrick's standard errors. We exclude the war years 1914–1923 and 1940–1949 for the 1850–2015 period.

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

Table 5: Return predictability: equity duration

	β^H	β^L	$\bar{R}^2$	F
Panel A: Aggregate market				
	0.07	0.01	0.02%	43.10
1850-1913	(0.47)	(0.07)		
	[3.61]***			
	0.23***	0.20	2.15%	28.00
1950-2015	(2.12)	(0.94)		
	[1.96]*			
	0.16	0.04	0.68%	51.05
1850-2015	(1.49)	(0.38)		
	[4.50]***			
Panel B: Large caps				
	0.09	0.05	-0.51%	22.77
1850-1913	(1.01)	(0.81)		
	[-3.33]***			
	0.22***	0.21	2.10%	28.43
1950-2015	(2.02)	(1.05)		
	[1.91]*			
	0.16	0.10	0.84%	59.38
1850-2015	(1.40)	(0.98)		
	[4.12]***			
Panel C: Small caps				
	0.00	0.05	-0.51%	22.77
1850-1913	(0.04)	(0.81)		
	[-3.33]***			
	0.07*	0.09*	0.56%	8.91
1950-2015	(1.74)	(1.81)		
	[1.45]			
	-0.03	0.03	-0.94%	2.29
1850-2015	(-0.47)	(0.85)		
	[3.40]***			

This table reports slope coefficients of the regressions of real log expected returns on lagged real log dividend yield and an equity duration dummy as an interaction term. Variables are calculated assuming no reinvestment of dividends within the year. The duration dummy yields 1 if the current duration is higher than average equity duration of that period, with equity duration calculated as $1 - dy_t \sum_{n=1}^{10} \left(\frac{1+\bar{g}}{1+\bar{r}}\right)^n$. The superscript "H" indicates a year is of high duration, and the superscript "L" indicates a year is of low duration. The figure in parentheses denotes the *p*-value of the slope coefficients based on Hodrick (1992) standard errors. R^2 is the adjusted R-squared and F is the F-statistic. In brackets are paired sample t-tests for the difference in mean. We exclude the war years 1914–1923 and 1940–1949 for the 1850–2015 period.

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

Table 6: Dividend growth and return predictability: dividend yield adjustments

	1850-1913	1950-2015	1850-2015
Panel A: Changing index composition			
	-0.41***	-0.13***	-0.09***
dg_t	(-7.16)	(-2.43)	(-2.61)
	38.81%	15.97%	5.97%
	-0.06	0.12***	0.03
r_t	(-0.94)	(2.47)	(1.15)
	1.65%	8.61%	0.93%
dy_t	0.68	0.40	0.49
	(7.89)	(2.03)	(3.27)
Panel B: Smoothed dividend yield			
	-0.18***	-0.12***	-0.10*
dg_t	(-3.79)	(-2.24)	(-1.84)
	18.96%	13.51%	4.16%
	-0.02	0.07**	0.04*
r_t	(-0.72)	(1.99)	(1.75)
	0.78%	4.22%	1.51%
dy_t	0.66	0.77	0.81
	(5.68)	(4.36)	(11.01)

This table reports slope coefficients of annual value-weighted real log dividend growth rates (*dg*), real log returns (*r*), and real log dividend yields (*dy*) on lagged real log dividend yield. Variables are calculated assuming no reinvestment of dividends within the year. In panel A, we adjust the log dividend yield for the structural break in 1986. We subtract the log dividend yield with $\overline{dy}_1$ and $\overline{dy}_2$ as the sample mean for, respectively, 1850–1986 and 1987–2015. All regressions include a constant. In panel A, we adjust the log dividend yield for a changing index composition in the post–World War II period. We sum the log dividend yields of the total market plus the sum of changes as a result of entering and exiting firms. The difference between dividend yields on continuously listed firms and the dividend yield of all firms listed in the current years can be attributed to composition changes. The figures in parentheses denote the *t*-statistics of slope coefficients based on Hodrick (1992) standard errors. Each third line reports the in-sample R-squared value. We exclude the years 1914–1923 and 1940–1949 for the 1850–2015 period in panel A and include the years 1914-1923 and 1940-1949 in panel B.

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

Appendices

In these appendices, we repeat all analyses with additional predictors and apply portfolio sorts based on characteristics and other calculation methods. Therefore, we introduce all the additional predictors in Appendix A. Appendix B includes the additional tests we run on Belgian stocks listed on the BSE.

Appendix A: Data sources

A1. Inflation

For the inflation series, we use consumer price index from various sources:

- Pre-1920: the series are constructed by Gerard (1928), Michotte (1937) and Nicolai (1921)
- 1921–1939: The FOD, Federal Public Service of Belgium
- 1940–1949: Annaert, Buelens and Deloof (2015)
- 1949–2015: The FOD, Federal Public Service of Belgium

For the 1940–1946 period, we merge the official CPI series with the black market index (Annaert et al., 2015). More specifically, we combine three quarters of data from the official market with one quarter from the black market.

A2. Risk-free rates

As of 1833, the Belgian government issued Treasury bills. This rate did not move much in the pre–World War I period, indicating that it did not fully reflect money market evolution (Gerard, 1928; Nicolai, 1921). The rate on commercial paper, however, was recognized as the best money market rate for this period (Dupriez, 1930). The data on risk-free rates are hand-collected from various sources, all on an annual basis:

- Pre-1918: the official quotation list of the Antwerp Stock Exchange
- 1919–1940: the National Bank of Belgium
- 1940–1945: Vanheurck (1954)
- 1945–1957: Baudhuin (1958) and Homer and Sylla (1991)
- Post-1957: the National Bank of Belgium and the newspaper *De Tijd*

A3. Term spread

The term spread is defined as the difference in yield on long- and short-term bonds.[11] The archives of the BSE contain bond prices and information that characterize different bond issues sold by the Belgian government in the nineteenth century. For the long-end of the term structure, we select three bond issues for which we construct a time-series of returns and yields.

[11] For the short-end of the term structure, we use the risk-free rate (cf. section A2).

The first government bond is called *Belgian Outstanding Debt 2 ½%* (or "Dette Active Belge 2 ½"). The Belgian government floated this bond as a perpetual loan without a final redemption date. This perpetuity comprises interest portions consisting of coupon payments at a rate of 2.5% of the face value per year, which the holder received at a regular interval of six months. In terms of amount borrowed, this was a large issue compared to standard emissions in the nineteenth century.

The second government bond is called *Belgian Debt 3%* (or "Emprunt Belge 3%") and addresses the problem of stale bond prices during the early years of quotations. More specifically, we use the Belgian Debt 3% for the 1850–1863 period. Starting in 1863, we shift to Belgian Outstanding Debt 2 ½%. This procedure avoids the issue of having to account for the probability of conversion for the 3% convertible bond.

From 1960, we use yields on Belgian government bonds with a 10 year maturity.

A4. Recession indicator

A recession is typically defined as a year where real GDP growth is negative for at least two quarters, as in Golez and Koudijs (2018). We let recessions start in the year an economic trough occurs and we let it end the year before an economic peak is reached. However, for the 1850–1950 period, we lack quarterly real GDP data. Therefore, we use negative annual real GDP growth and complement this with at least three different sources that indicate the Belgian economy was in a recession.[12] For the post–World War II period, we use quarterly GDP growth data.

We record 56 recessions, 21 in the pre–World War I period and 21 in the post–World War II period. We report summary statistics when we condition on the economic regime (cf. Table A1). We see that dividend growth rates and returns are higher during expansions than in recessions. The autocorrelation of dividend yields is higher in expansions relative to recessions (respectively 0.80 and 0.49 in the overall period).

A5. Industry portfolios

To bypass potential criticism that our conclusions are driven by specific sectors, we target industry portfolios. Annaert, Buelens and De Ceuster (2012) provide an in-depth analysis of the sector shifts on the BSE. In 1860, the BSE was dominated by three sectors, transportation (42% of overall market capitalization), financials (24%) and industrials (21%). In 1880, the relative importance of the transportation industry decreased heavily (34%), favoring bank and real estate firms (32%). In 1898, capital was largely reallocated to industrials, with a diminishing role for the railroad industry.

[12] This includes Baudhuin (1958), Chlepner (1930), De Clercq (1992), Gerard (1928) Homer and Sylla (1991), Morgenstern (1959), Romer (1994) and Van de Velde (1943).

Inspired by these findings, we specify three industry portfolios (cf. Figure A1):

- *Financials*, which includes financial institutions (banks and insurance companies), holdings, holding-trusts, conglomerates, and investment companies. The corresponding SIC codes are 60–64 and 67
- *Industrials*, which includes food products, consumer goods, apparel, chemicals, rubber and plastics, textiles, construction materials, construction, steel works, fabricated products, precious metals, non-metallic mining, automobiles and trucks, machinery, and coal (Fama and French, 1997)
- *Transportation*, which includes transportation over land (railroads, taxis, and buses), but excludes all firms operating in transportation over water or by air. The corresponding SIC codes are 40–42.

Appendix B: Robustness tests

B1. Calculation methods

B1.1. Nominal terms

Although the main analysis is in real terms, we also provide evidence in nominal terms (Engsted and Pedersen, 2010). If there are differences in the evidence between nominal and real terms, dividend yield has forecasting abilities on expected inflation. Given rational expectations, changes in expected inflation are incorporated into expected nominal dividend growth and expected nominal returns, which leaves dividend yields unaffected. This does not hold when expected inflation affects expected dividend growth rates and returns through other economic mechanisms (Engsted and Pedersen, 2016).

B1.2. With reinvestment

When we use a reinvestment assumption, we add the superscript "*re*" to variables, that is, $dg_{t+1}^{re} = \log(D_{t+1}^{re}/D_t^{re})$. We calculate reinvested dividends as monthly dividends issued in month *t-i*, which are reinvested in the stock market between two periods. More specifically,

$$D_{t,t-i} = \exp\left(\sum\nolimits_{j=1}^{i} r_{t-i-j}\right) D_{t-i} \text{ for } i > 0 \quad \text{(A25)}$$

$$D_t^{re,12} = \sum_{i=0}^{11} D_{t,t-i} \quad \text{(A26)}$$

The log dividend yield and dividend growth rate with reinvestment becomes

$$dy_t^{re} = \ln\left(\frac{D_t^{re,12}}{P_t}\right) \quad \text{(A27)}$$

$$dg_t^{re} = \ln\left(\frac{D_t^{re,12}}{D_{t-1}^{re,12}}\right) \quad \text{(A28)}$$

B2. Bivariate regressions

B2.1. Risk-free rate

We could disentangle a nominal stock return as a risk premium and a nominal risk-free rate. In consequence, dividend yield variability comes from changing expectations in cash flows, changing expectations in nominal returns, or changing expectations in expected risk-free rates (Ang and Bekaert, 2007), that is,

$$y_{t+1} = \alpha + \beta^{rf}\, rf_t + \beta^{dy}\, dy_t + \varepsilon_{t+1} \tag{A29}$$

where rf_t is the risk-free rate and y_{t+1} is either expected excess returns or expected dividend growth.

B2.2. Dividend volatility

In the US, dividend volatility is proposed as a potential explanation for the reversal from dividend growth to return predictability. If this were the case, controlling for dividend volatility should not alter our conclusions. In the spirit of Chen (2009), we run a bivariate regression of the form:

$$y_{t+1} = \alpha + \beta^{dy} dy_t + \beta^{V} vol_t + \varepsilon_{t+1} \tag{A30}$$

where vol_t is calculated as log dividend growth volatility for the past 12 months.

B2.3. Term spread

Business cycle variation is vital to understanding stock price movements. Return predictability is strongly linked to business cycle variations, with a substantially greater degree of predictability evident during recessions vis-à-vis expansions (Golez and Koudijs, 2018). As in Fama and French (1989), we run a bivariate regression with a term spread as additional predictor, that is,

$$y_{t+1} = \alpha + \beta^{dy} dy_t + \beta^{ts}\, ts_t + \varepsilon_{t+1} \tag{A31}$$

where ts_t is the term spread.

B2.4. Recession indicator

Another way to capture business cycle variation is through a recession indicator (Golez and Koudijs, 2018). We add the recession dummy as an additional predictor, that is,

$$y_{t+1} = \alpha + \beta^{dy} dy_t + \beta^{i}\, I_t + \varepsilon_{t+1} \tag{A32}$$

where I_t is a recession dummy, which equals 1 if there is a recession, and zero otherwise.

B2.5. Recession switching regression

An alternative way to model changing economic regimes is to use an OLS switching regression with a recession dummy as an interaction effect (Møller and Sander, 2017). By adding this interaction effect, we disentangle the impact different economic regimes have on return and dividend growth predictability. This captures the idea that return predictability is more pronounced during a recession than during an expansion. We run a bivariate regression with recession interaction dummy, that is,

$$y_{t+1} = (\alpha + \beta^R dy_t)\, I_t + (\alpha + \beta^E dy_t)\,(1 - I_t) + \varepsilon_{t+1}^r \quad \text{(A33)}$$

where I_t is a recession dummy, which equals 1 if there is a recession, and 0 otherwise.

B3. Equity duration

As an additional robustness test, we estimate the empirical modified duration for an asset, as in (Jiang and Sun, 2017). Jiang and Sun (2017) show that stocks with high dividend growth tend to have longer equity duration with a relatively greater price increase when interest rates fall. We run the following regression,

$$r_{i,t} - rf_{i,t} = \alpha + duration(-\Delta interest_t) + \beta(mr_{i,t} - rf_{i,t}) + \varepsilon_{t+1}^r \quad \text{(A34)}$$

where $r_{i,t}$ is the log return of value or growth portfolio, $\Delta interest_t$ is the change in long-term interest rates, and $mr_{i,t}$ is the aggregate return of all Belgian stocks listed on the BSE.

We follow the methodology in Jiang and Sun (2017) closely to increase comparability. At the end of December from 1849 to 2014, we sort Belgian stocks into tercile portfolios based on past dividend yield. We compute value-weighted and equally weighted returns for each tercile portfolio and estimate durations of the bottom (growth stocks) and top (value stocks) tercile through regression A10. To control for changes in the aggregate market, we include aggregate excess return as an additional predictor. We confirm the evidence that growth stocks have relatively greater sensitivity to changes in interest rates than value stocks, and thus have longer duration.

Figures

Figure A1: Industry portfolios

This figure plots the number of listed stocks for industry portfolios on the BSE for the 1850–2015 period. We include stocks from *industrials* (blue), *financials* (orange) and *transportation* (yellow). The data are on an annual basis.

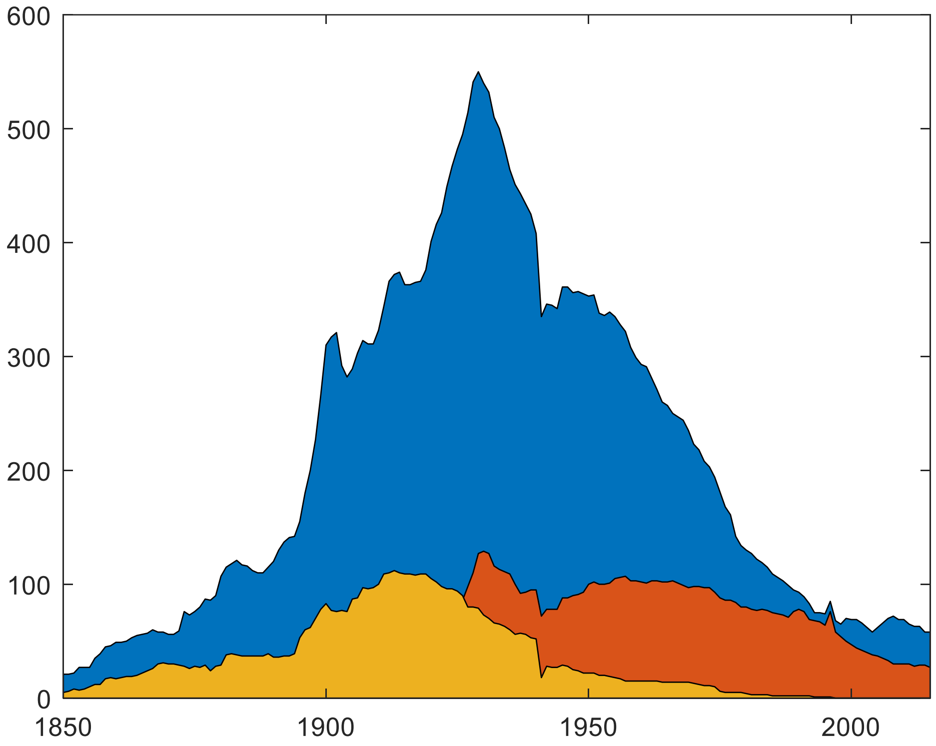


Figure A2: Rolling regression of dividend growth predictability

This figure plots regression coefficients, t-statistics, and R-squared of rolling regressions of log expected dividend growth rates on log dividend yield (panel A) and log adjusted dividend yield (panel B). We choose a rolling regression window of 20 years. All data are in nominal terms. The orange (blue) line represents dividends without (with) reinvestment. This figure covers the 1850–2015 period, including the war years, 1914–1923 and 1940–1949.

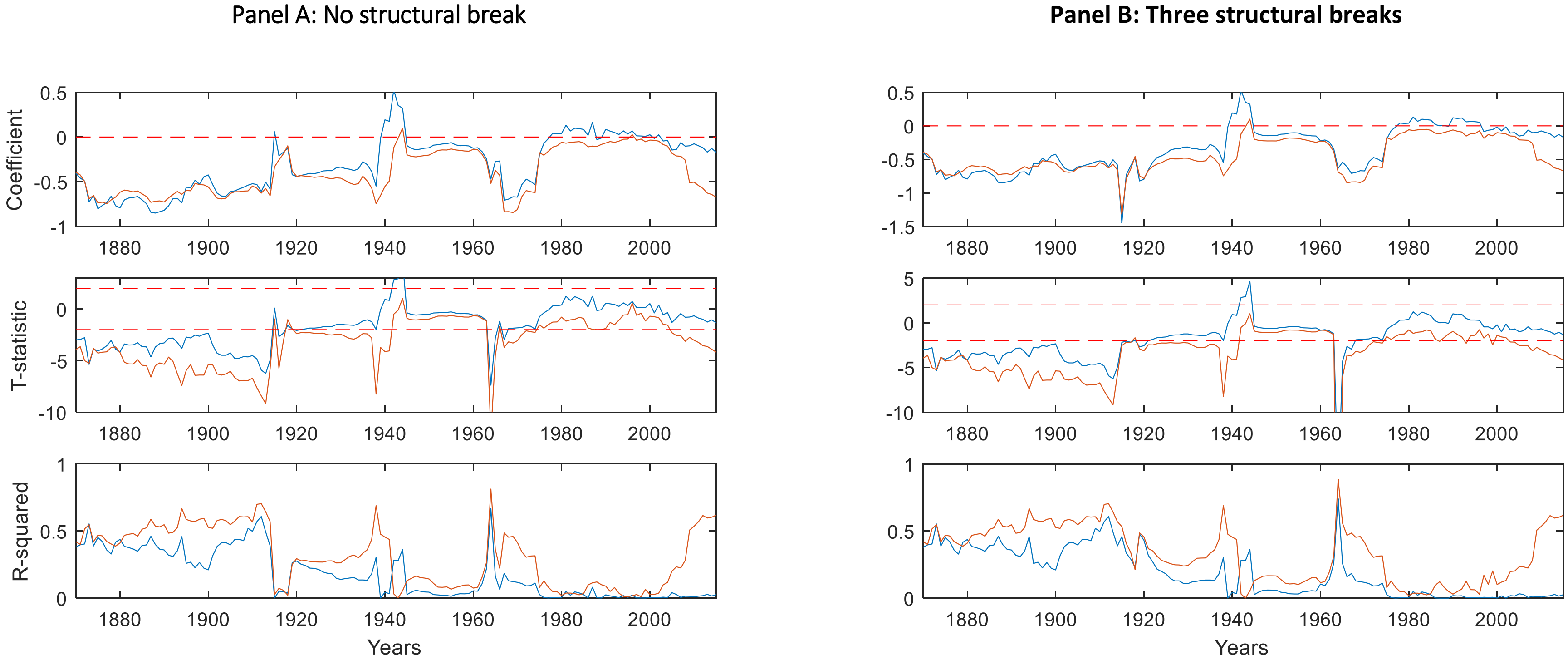


Figure A3: Rolling regression of return predictability

This figure plots regression coefficients, t-statistics, and R-squared of rolling regressions of log expected returns on log dividend yield (panel A) and log adjusted dividend yield (panel B). We choose a rolling regression window of 20 years. All data are in nominal terms. The orange (blue) line represents dividends without (with) reinvestment. This figure covers the 1850–2015 period, including the war years, 1914–1923 and 1940–1949.

Panel A: No structural break

Panel B: Three structural breaks

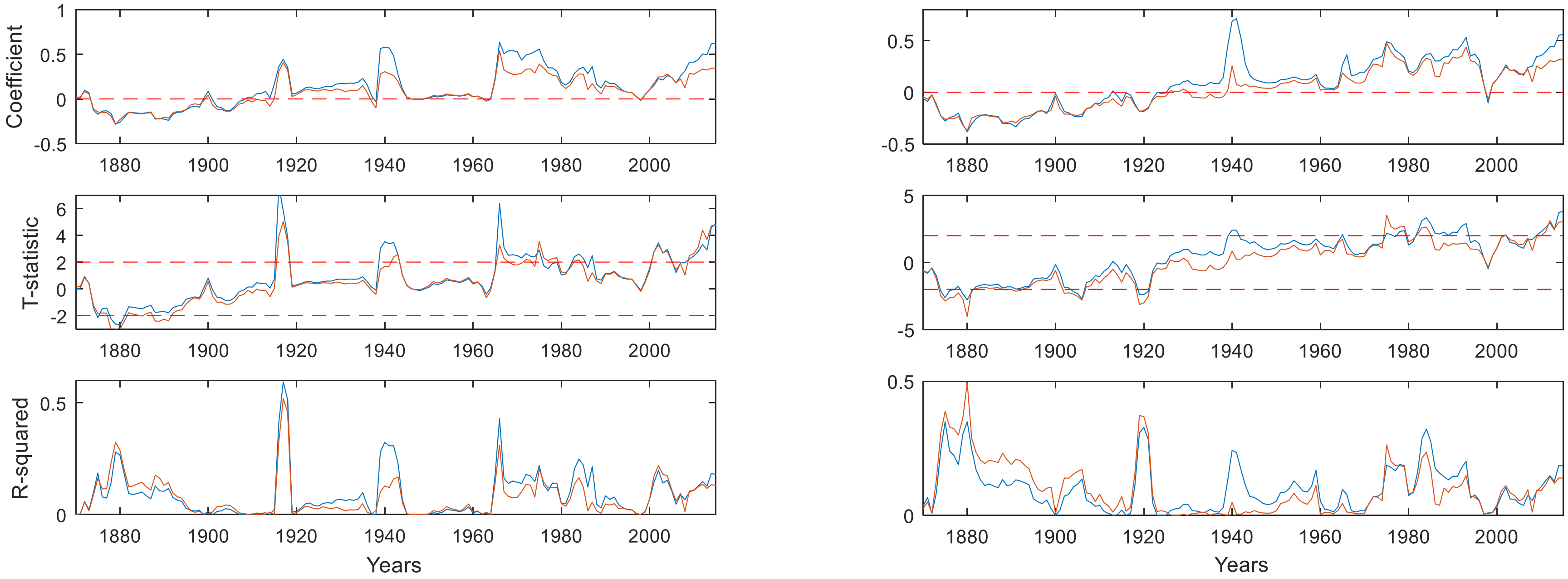
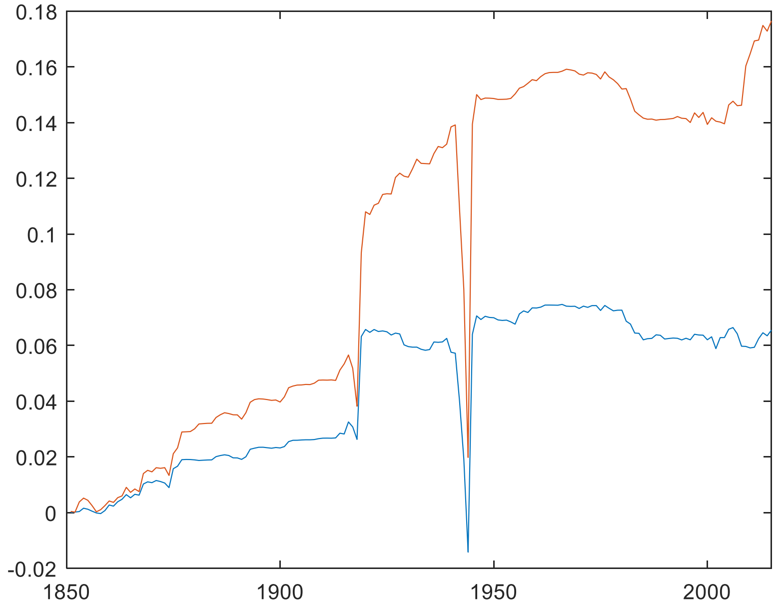


Figure A4: R-squared decomposition

This figure plots the difference in cumulative sum of squared residuals between the model with only a constant and the model with a constant and an adjusted dividend yield. The differences in the sum of squared residuals are normalized by the total sum of squared residuals, which indicates that the last observation equals the total in-sample R-squared. Panel A shows the predictive regressions of expected dividend growth, and panel B that of expected returns. All data are in nominal terms. The orange (blue) line represents dividends without (with) reinvestment. This figure covers the 1850–2005 period with the war years included.

Panel A: Dividend growth predictability



Panel B: Return predictability

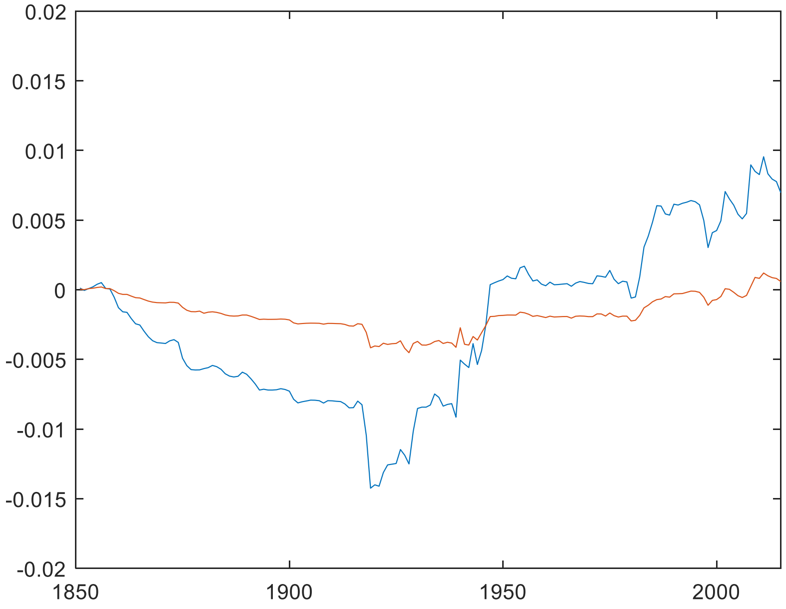


Figure A5: Dividend seasonality

This figure plots the percentage of dividend payments each month for all listed Belgian stocks on the BSE. It covers the 1850–2015 period, including the periods 1914–1923 and 1940–1949.

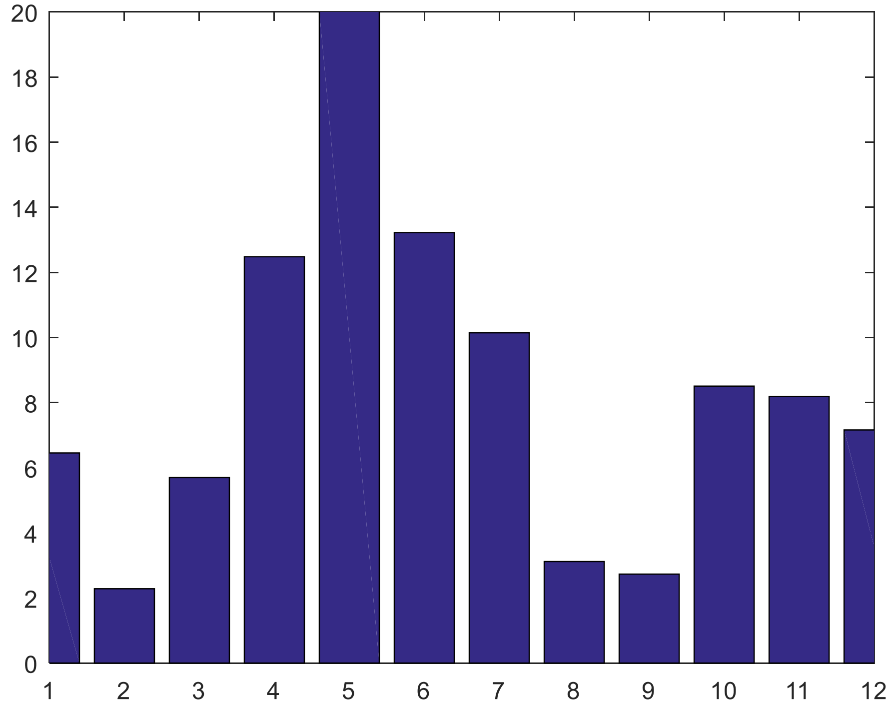


Figure A6: Dividend yield

This figure plots log dividend yields with (orange) and without (blue) reinvestment of dividends. It covers the 1850–2015 period, including the periods 1914–1923 and 1940–1949. The red line denotes mean log dividend yields. The dashed lines denote the standard errors of the mean log dividend yield. Data are on an annual basis.

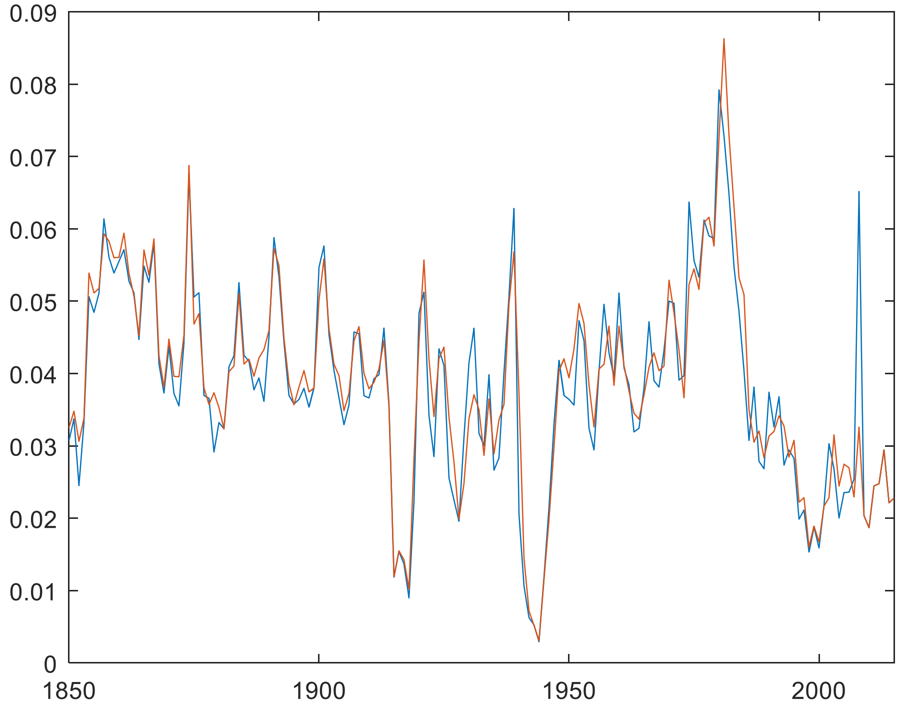


Figure A7: Annual nominal returns and annual nominal dividend growth rates without reinvestment

This figure plots annual nominal dividend growth rates (orange) and annual nominal total returns (blue), without reinvestment of dividends. It covers the 1850–2015 period, including the periods 1914–1923 and 1940–1949. Data are on an annual basis.

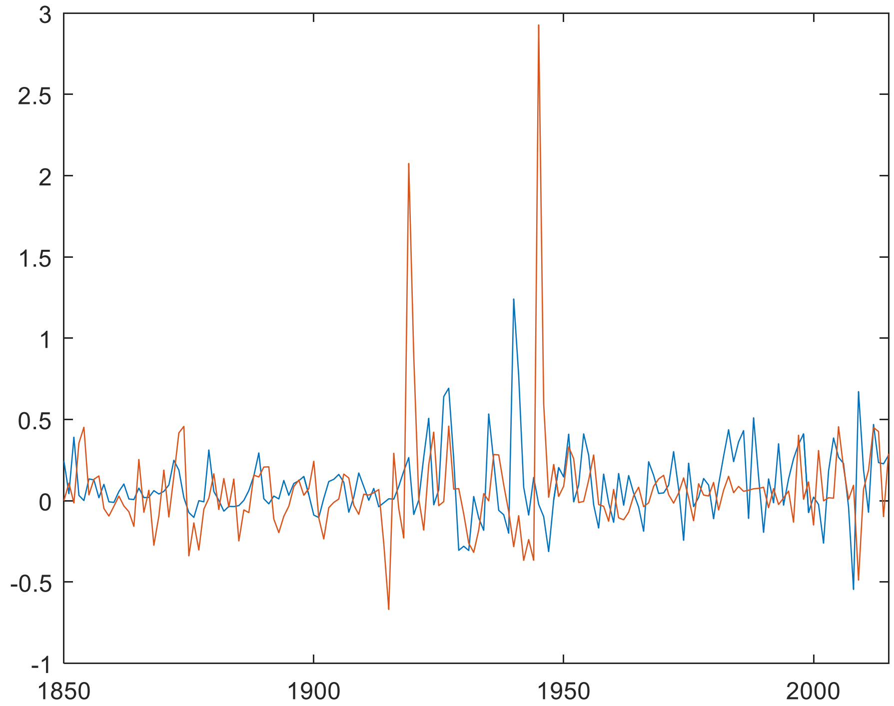


Figure A8: Annual nominal returns and annual nominal dividend growth rates with reinvestment

This figure plots annual nominal dividend growth rates (orange) and annual nominal total returns (blue), with reinvestment of dividends. It covers the 1850–2015 period, including the war years 1914–1923 and 1940–1949. Data are on an annual basis.

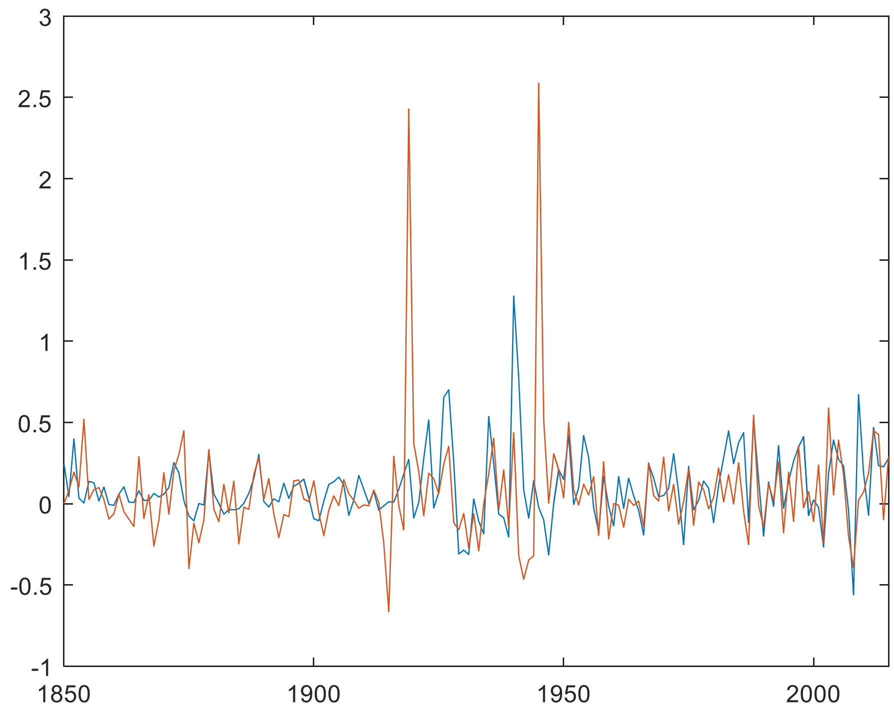
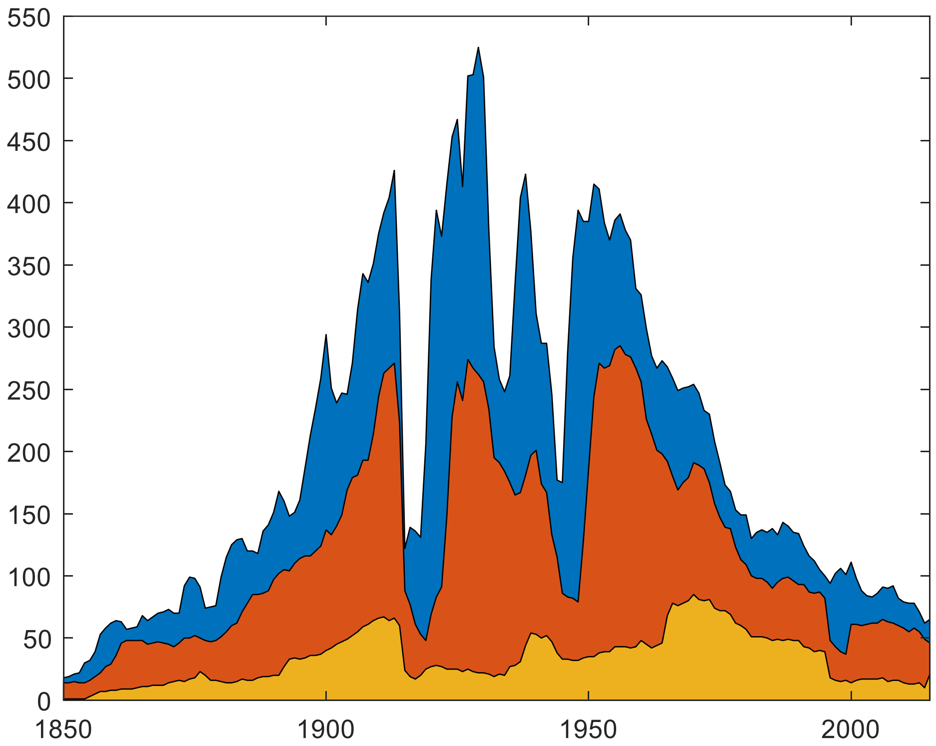


Figure A9: Dinosaur portfolios

This figure plots the number of Belgian stocks that paid dividends (blue), that paid at least five years of dividends consistently (orange), and that paid at least 20 years of dividends consistently (yellow). All data are on an annual basis. The data cover the 1850–2015 period, but the calculations start as of 1824.



Tables

Table A1: Summary statistics

	1850-2015			1850-1913			1950-2015			1914-1950		
Variable	Mean	Std.	Ser. corr.	Mean	Std.	Ser. corr.	Mean	Std.	Ser. corr.	Mean	Std.	Ser. corr.
Panel A: Nominal Data												
dg_t	6.73	17.50	0.13	4.99	15.71	0.30	8.74	17.19	-0.16	11.64	44.61	0.07
r_t	10.85	17.80	0.18	8.76	9.71	0.24	13.23	19.84	-0.04	14.28	28.51	0.31
dy_t	3.31	33.23	0.74	3.20	21.93	0.68	3.39	39.58	0.77	3.78	67.65	0.61
${dg_t}^{\mathrm{RE}}$	6.70	17.94	-0.01	4.81	15.13	0.19	8.65	19.02	-0.22	11.93	43.96	0.01
${r_t}^{\mathrm{RE}}$	10.98	18.11	0.18	8.93	9.89	0.24	13.36	20.24	-0.04	14.45	28.91	0.31
${dy_t}^{\mathrm{RE}}$	3.27	30.57	0.83	3.15	18.62	0.69	3.35	37.08	0.88	3.69	64.93	0.72
Panel B: Real Data												
dg_t	4.79	16.42	0.06	4.84	14.52	0.22	5.49	17.26	-0.13	2.64	56.70	0.08
r_t	8.91	17.73	0.10	8.61	11.21	0.25	9.98	20.35	--0.02	5.28	30.68	0.10
dy_t	3.31	33.23	0.74	3.20	21.93	0.68	3.39	39.58	0.77	3.78	67.65	0.61
${dg_t}^{\mathrm{RE}}$	4.76	17.25	-0.07	4.65	14.28	0.12	5.40	19.16	-0.19	2.94	56.92	0.01
${r_t}^{\mathrm{RE}}$	9.04	18.04	0.10	8.77	11.37	0.25	10.11	20.74	-0.02	5.45	31.01	0.10
${dy_t}^{\mathrm{RE}}$	3.27	30.57	0.83	3.15	18.62	0.68	3.35	37.08	0.88	3.69	64.93	0.72

The data are annual and cover the period 1850–2015, taken from the SCOB database. The mean, standard deviation ("std.") and first-order serial correlation ("ser. corr.") of log returns (*r*), log dividend growth rates (*dg*), and log dividend yield (*dy*) are computed for various periods. All figures are percentages, or the log of the percentage in the case of the dividend yield. Two sets of variables are used. The first assumes monthly dividends are reinvested in the stock market within each year. These variables have superscript "*re*." The second set assumes non-reinvestment of dividends within each year. These variables carry no superscript. The top panel presents results for nominal variables, whereas the bottom panel contains the results for real variables. Real variables are computed by deflating their nominal counterparts by Belgian CPI. In panel C, we excluded the two world wars (1914–1923, and 1940–1949) from this sample.

Table A2: Summary statistics conditioning on economic regimes

Variable		1850-2015 Mean	1850-2015 Std.	1850-2015 Ser. corr.	1850-1913 Mean	1850-1913 Std.	1850-1913 Ser. corr.	1950-2015 Mean	1950-2015 Std.	1950-2015 Ser. corr.
r_t	Recession	0.04	0.18	-0.02	0.03	0.06	0.12	0.11	0.25	-0.21
	Expansion	0.15	0.16	0.29	0.13	0.10	0.07	0.14	0.17	0.11
dg_t	Recession	0.03	0.19	0.06	0.00	0.17	-0.13	0.09	0.22	-0.04
	Expansion	0.09	0.16	0.00	0.08	0.14	0.19	0.09	0.15	-0.12
dy_t	Recession	3.19	0.30	0.49	3.11	0.15	0.16	3.24	0.43	0.57
	Expansion	3.38	0.33	0.80	3.26	0.24	0.77	3.46	0.37	0.80
${r_t}^{\mathrm{RE}}$	Recession	0.04	0.18	-0.03	0.03	0.06	0.12	0.11	0.25	-0.21
	Expansion	0.15	0.16	0.29	0.13	0.10	0.07	0.14	0.18	0.12
${dg_t}^{\mathrm{RE}}$	Recession	0.04	0.17	0.01	-0.01	0.15	-0.26	0.13	0.17	-0.05
	Expansion	0.08	0.18	-0.09	0.08	0.14	0.14	0.07	0.20	-0.22
${dy_t}^{\mathrm{RE}}$	Recession	3.19	0.28	0.65	3.10	0.14	0.18	3.21	0.38	0.74
	Expansion	3.32	0.31	0.83	3.19	0.20	0.77	3.41	0.35	0.84
RF	Recession	0.04	0.03		0.03	0.01		0.06	0.05	
	Expansion	0.04	0.02		0.03	0.00		0.04	0.03	
Term spread	Recession	0.01	0.01		0.01	0.01		0.01	0.02	
	Expansion	0.02	0.01		0.02	0.01		0.02	0.01	
CPI	Recession	0.01	0.05		-0.01	0.05		0.05	0.04	
	Expansion	0.03	0.05		0.01	0.06		0.03	0.02	
Number of recessions			56			25			21	

This table reports summary statistics of all stocks listed on the BSE. The mean, standard deviation ("std.") and first-order serial correlation ("ser. corr.") of log dividend growth rates (*dg*), log returns (*r*), and log dividend yield (*dy*) are computed. All figures are percentages, or the log of the percentage in the case of dividend yields. Two sets of variables are used. The first assumes no reinvestment of dividends. The second assumes monthly reinvestment of dividends at the market rate of return. These variables have superscript "*re*." Real variables are computed by deflating the nominal data by Belgian CPI. We exclude the periods 1914–1923 and 1940–1949 from the 1850–2015 period. For the 1850–1950 horizon, we define a recession as a year with negative annual GDP growth, combined with three different sources that indicate that the Belgian economy was in recession. For the post–World War II period, we use quarterly GDP growth data.

Table A3: Correlation matrix

		Nominal data						Real data					
		dg_t	r_t	dy_t	dg_t^{RE}	r_t^{RE}	dy_t^{RE}	dg_t	r_t	dy_t	dg_t^{RE}	r_t^{RE}	dy_t^{RE}
1850-2015	r_t	0.16	1.00					0.10	1.00				
	dy_t	0.58	-0.72	1.00				0.57	-0.76	1.00			
	dg_t^{RE}	0.70	0.62	-0.02	1.00			0.67	0.60	-0.05	1.00		
	r_t^{RE}	0.15	0.99	-0.72	0.62	1.00		0.10	0.99	-0.76	0.60	1.00	
	dy_t^{RE}	0.62	-0.47	0.82	0.41	-0.46	1.00	0.61	-0.51	0.82	0.39	-0.50	1.00
		dg_t	r_t	dy_t	dg_t^{RE}	r_t^{RE}	dy_t^{RE}	dg_t	r_t	dy_t	dg_t^{RE}	r_t^{RE}	dy_t^{RE}
1850-1914	r_t	0.02	1.00					0.10	1.00				
	dy_t	0.80	-0.59	1.00				0.70	-0.64	1.00			
	dg_t^{RE}	0.85	0.42	0.44	1.00			0.84	0.46	0.32	1.00		
	r_t^{RE}	0.03	0.99	-0.58	0.42	1.00		0.11	0.99	-0.64	0.46	1.00	
	dy_t^{RE}	0.84	-0.32	0.89	0.72	-0.33	1.00	0.76	-0.43	0.89	0.60	-0.43	1.00
		dg_t	r_t	dy_t	dg_t^{RE}	r_t^{RE}	dy_t^{RE}	dg_t	r_t	dy_t	dg_t^{RE}	r_t^{RE}	dy_t^{RE}
1950-2015	r_t	0.03	1.00					0.02	1.00				
	dy_t	0.62	-0.78	1.00				0.59	-0.80	1.00			
	dg_t^{RE}	0.54	0.62	-0.15	1.00			0.54	0.64	-0.19	1.00		
	r_t^{RE}	-0.02	0.99	-0.79	0.63	1.00		0.01	0.99	-0.80	0.65	1.00	
	dy_t^{RE}	0.63	-0.49	0.78	0.37	-0.48	1.00	0.60	-0.51	0.78	0.33	-0.50	1.00

This table reports correlations among all variables. Two sets of variables are used. The first assumes dividends without reinvestment. The second assumes monthly reinvestment of dividends at the market rate of return. These variables have superscript "*re*." Real variables are computed by deflating the nominal data by Belgian CPI. We exclude the periods 1914–1923 and 1940–1949 from the 1850-2015 period.

Table A4: Dividend growth and return predictability: univariate regressions

	Without reinvestment				With reinvestment			
	1850-1913	1950-2015	1850-2015	1850-2015*	1850-1913	1950-2015	1850-2015	1850-2015*
Panel A: No structural breaks								
Panel A1: Nominal data								
dg_t	-0.47***	-0.18***	-0.27***	-0.23***	-0.44***	-0.05	-0.13***	-0.15
	(-7.25)	(-3.70)	(-6.74)	(-2.46)	(-4.62)	(-1.03)	(-2.67)	(-1.41)
	42.29%	17.18%	25.56%	17.65%	29.85%	1.15%	5.04%	6.55%
r_t	-0.12***	0.08	0.01	0.01	-0.11*	0.08	0.04	0.04
	(-2.06)	(1.46)	(0.16)	(0.35)	(-1.74)	(1.30)	(0.74)	(1.33)
	7.45%	2.44%	0.02%	0.06%	4.37%	2.20%	0.46%	0.74%
dy_t	0.68	0.77	0.75	0.78	0.69	0.89	0.86	0.84
	(7.89)	(9.97)	(13.71)	(8.01)	(7.29)	(17.49)	(19.94)	(8.00)
Panel A2: Real data								
dg_t	-0.41***	-0.21***	-0.26***	-0.20*	-0.38***	-0.09*	-0.13***	-0.14
	(-7.16)	(-4.54)	(-7.08)	(-1.68)	(-4.33)	(-1.65)	(-2.73)	(-1.04)
	38.81%	23.08%	26.74%	4.07%	24.75%	2.81%	5.27%	4.07%
r_t	-0.06	0.05	0.02	0.03	-0.04	0.05	0.04	0.05
	(-0.94)	(0.88)	(0.40)	(0.73)	(-0.60)	(0.78)	(0.78)	(0.91)
	1.65%	0.90%	0.11%	0.66%	0.58%	0.77%	0.51%	1.04%
dy_t	0.68	0.77	0.75	0.78	0.69	0.89	0.86	0.84
	(7.89)	(9.97)	(13.71)	(8.01)	(7.29)	(17.49)	(19.94)	(8.00)
Panel B: One structural break								
Panel B1: Nominal data								
dg_t	-0.47***	-0.36***	-0.38***	-0.24***	-0.44***	-0.02	-0.15***	-0.15
	(-7.25)	(-3.19)	(-6.09)	(-2.29)	(-4.62)	(-0.30)	(-2.21)	(-1.26)
	42.29%	29.14%	31.70%	18.08%	29.85%	0.07%	3.69%	6.14%
r_t	-0.12***	0.24***	0.07	0.02	-0.11*	0.33***	0.15***	0.06*
	(-2.06)	(3.11)	(1.04)	(0.73)	(-1.74)	(3.83)	(2.24)	(1.87)
	7.45%	10.12%	1.07%	1.46%	4.37%	5.73%	3.65%	1.46%
dy_t	0.68	0.47	0.60	0.75	0.69	0.70	0.73	0.81
	(7.89)	(2.56)	(4.40)	(6.75)	(7.29)	(3.39)	(7.56)	(6.77)
Panel B2: Real data								
dg_t	-0.41***	-0.38***	-0.36***	-0.21	-0.38***	-0.05	-0.15***	-0.14
	(-7.16)	(-3.63)	(-6.32)	(-1.52)	(-4.33)	(-0.58)	(-2.32)	(-0.87)
	38.81%	32.78%	32.98%	9.84%	24.75%	0.30%	3.86%	3.47%
r_t	-0.06	0.22***	0.09	0.05	-0.04	0.30***	0.16***	0.07
	(-0.94)	(2.58)	(1.35)	(0.97)	(-0.60)	(3.31)	(2.32)	(1.15)
	1.65%	7.87%	1.62%	1.45%	0.58%	9.94%	3.81%	2.18%
dy_t	0.68	0.47	0.60	0.75	0.69	0.70	0.73	0.81
	(7.89)	(2.56)	(4.40)	(6.75)	(7.29)	(3.39)	(7.56)	(6.77)

This table reports slope coefficients of annual value-weighted log dividend growth rates (*dg*), log returns (*r*) and log dividend yields (*dy*) on lagged log dividend yields. In panel A, we do not adjust the log dividend yield for a structural break. In panel B, we adjust the log dividend yield for the structural break in 1986. We subtract the log dividend yield with $\overline{dy}_1$ and $\overline{dy}_2$ as the sample mean for, respectively, the 1850–1986 and 1987–2015 periods. "With reinvestment" indicates the variable is computed with monthly dividends reinvested at the market rate of return within each year. All regressions include a constant. The figures in parentheses denote the *t*-statistics of the slope coefficients, based on Hodrick (1992) standard errors. Each third line reports the in-sample R-squared value. Real data are obtained by deflating the nominal data by Belgian CPI. We exclude the periods 1914–1923 and 1940–1949 from the 1850–2015 period, and include them for the 1850–2015* period.

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

Table A5: Dividend growth and return predictability: payout policy

	Without reinvestment			**With reinvestment**		
	1850-1913	1950-2015	1850-2015	1850-1913	1950-2015	1850-2015
Panel A: Payout Dinosaurs						
Panel A1: Nominal terms						
	-0.40***	-0.07***	-0.12***	-0.10	-0.01	-0.06
dg_t	(-4.34)	(-1.91)	(-3.07)	(-1.52)	(-0.17)	(-1.36)
	16.19%	6.61%	6.18%	2.93%	0.05%	1.83%
	0.02	0.17***	0.01	0.04	0.17***	0.05
r_t	(0.42)	(2.70)	(0.15)	(0.84)	(2.70)	(1.17)
	0.22%	10.24%	0.00%	0.98%	10.00%	1.31%
Panel A2: Real terms						
	-0.29***	-0.09***	-0.11***	-0.12	-0.03	-0.05
dg_t	(-4.08)	(-2.07)	(-2.93)	(-1.19)	(-0.43)	(-1.30)
	15.70%	8.68%	5.70%	3.28%	0.39%	1.75%
	0.03	0.15***	0.02	0.05	-0.15***	0.05
r_t	(0.50)	(2.57)	(0.40)	(0.86)	(2.57)	(1.17)
	0.34%	8.46%	0.17%	1.04%	8.79%	1.31%
Panel B: Payout Young Dinosaurs						
Panel B1: Nominal terms						
	-0.30***	-0.21***	-0.20***	-0.19***	-0.05	-0.07
dg_t	(-5.14)	(-2.77)	(-5.66)	(-2.40)	(-0.60)	(-1.30)
	21.82%	16.49%	20.33%	8.15%	0.43%	1.76%
	0.00	0.19***	0.04	0.04	0.20***	0.06
r_t	(0.07)	(2.92)	(0.80)	(0.71)	(2.88)	(1.13)
	0.00%	8.52%	0.56%	0.52%	8.93%	1.31%
Panel B2: Real terms						
	-0.25***	-0.23***	-0.18***	-0.16***	-0.08	-0.06
dg_t	(-4.31)	(3.24)	(-5.53)	(-1.95)	(-1.01)	(-1.26)
	17.68%	20.15%	19.82%	6.06%	1.17%	1.75%
	0.05	0.16***	0.04	0.07	0.17***	0.06
r_t	(0.90)	(2.39)	(0.80)	(1.14)	(2.40)	(1.13)
	0.80%	6.02%	0.56%	1.48%	6.35%	1.38%
Panel C: Payout Non-dinosaurs						
Panel C1: Nominal terms						
	-0.51***	-0.45***	-0.33***	-0.43***	-0.23***	-0.20***
dg_t	(-7.57)	(-4.53)	(-7.77)	(-4.46)	(-2.35)	(-3.81)
	47.31%	27.41%	30.25%	24.35%	4.18%	8.90%
	-0.13***	0.25***	-0.00	-0.13***	0.31***	0.02
r_t	(-2.17)	(3.26)	(-0.03)	(-2.10)	(4.09)	(0.34)
	9.66%	10.74%	0.00%	6.83%	11.47%	0.01%
Panel C2: Real terms						
	-0.46***	-0.41***	-0.32***	-0.45***	-0.15	-0.20***
dg_t	(-7.56)	(-4.00)	(-7.91)	(-5.89)	(-1.44)	(-3.84)
	44.67%	27.81%	31.59%	32.30%	2.42%	9.32%
	-0.08	-0.22***	-0.00	0.08	0.25	0.02
r_t	(-1.26)	(2.74)	(-0.03)	(-1.08)	(3.52)	(0.34)
	3.07%	8.55%	0.00%	1.80%	8.22%	0.00%

This table reports slope coefficients of annual value-weighted log dividend growth rates (*dg*), log returns (*r*), and log dividend yields (*dy*) on lagged log dividend yields. In panel A, we select those firms that have paid a dividend consistently for at least 20 years. The calculations starts as of 1824. In panel B, we select those firms that have paid a dividend consistently for at least 5 years. In panel C, we select all firms that have not paid a dividend consistently for at least 20 years. "With reinvestment" indicates the variable is computed with monthly dividends reinvested at the market rate of return within each year. All regressions include a constant. The figures in parentheses denote the *t*-statistics of the slope coefficients, based on Hodrick (1992) standard errors. Each third line reports the in-sample R-squared value. Real data are obtained by deflating the nominal data by Belgian CPI. We exclude the periods 1914–1923 and 1940–1949 from the 1850–2015 period.

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

Table A6: Dividend growth and return predictability: size-sorted portfolios

	Without reinvestment			**With reinvestment**		
	1850-1913	1950-2015	1850-2015	1850-1913	1950-2015	1850-2015
Panel A: Small cap stocks						
Panel A1: Nominal data						
dg_t	-0.62***	-0.56***	-0.48***	-0.61***	-0.55***	-0.46***
	(-5.11)	(-5.43)	(-6.74)	(-4.83)	(-4.83)	(-6.10)
	33.10%	27.92%	25.36%	31.08%	25.89%	22.73%
r_t	-0.03	0.06***	-0.01	-0.02	0.07***	-0.01
	(-1.13)	(2.00)	(-0.03)	(-0.83)	(2.13)	(0.26)
	1.77%	6.34%	0.00%	0.95%	7.93%	0.00%
Panel A2: Real data						
dg_t	-0.62***	-0.57***	-0.48***	-0.60***	-0.45***	-0.40***
	(-5.01)	(-5.59)	(-6.91)	(-4.75)	(-3.57)	(-3.99)
	32.16%	29.17%	25.70%	30.16%	22.72%	16.19%
r_t	-0.03	0.09***	-0.00	-0.02	0.10***	0.03
	(-0.84)	(1.87)	(-0.09)	(-0.59)	(2.06)	(0.60)
	1.12%	9.35%	0.01%	0.54%	11.50%	0.20%
Panel B: Large cap stocks						
Panel B1: Nominal data						
dg_t	-0.48***	-0.35***	-0.37***	-0.45***	-0.04	-0.14***
	(-6.77)	(-3.14)	(-5.85)	(-4.33)	(-0.42)	(-2.13)
	42.07%	28.13%	31.34%	27.81%	0.17%	3.25%
r_t	-0.08	0.24***	0.09	-0.05	0.31***	0.18***
	(-1.24)	(3.11)	(1.26)	(-0.81)	(3.71)	(2.58)
	2.93%	10.07%	1.65%	0.87%	11.60%	4.83%
Panel B2: Real data						
dg_t	-0.43***	-0.37***	-0.37***	-0.39***	-0.06	-0.14***
	(-6.68)	(-3.56)	(-5.96)	(-4.13)	(-0.71)	(-2.20)
	40.24%	31.60%	32.78%	23.76%	0.48%	3.45%
r_t	-0.02	0.21***	0.10	0.01	0.29***	0.18***
	(-0.35)	(2.57)	(1.56)	(0.17)	(3.19)	(2.64)
	0.21%	7.81%	2.32%	0.03%	9.36%	4.99%

This table reports slope coefficients of annual value-weighted log dividend growth rates (*dg*), log returns (*r*), and log dividend yields (*dy*) on lagged log dividend yields of the bottom quintile based on market capitalization (panel A), the bottom quintile based on dividend yield (panel B), and the bottom quintile based on return volatility (panel C). "With reinvestment" indicates the variable is computed with monthly dividends reinvested at the market rate of return within each year. The figures in parentheses denote the *t*-statistics of the respective slope coefficients, based on Hodrick (1992) standard errors. Each third line reports the in-sample R-squared value. Real data are obtained by deflating the nominal data by Belgian CPI. We exclude the periods 1914–1923 and 1940–1949 from the 1850–2015 period.

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

Table A7: Dividend growth and return predictability: industry portfolio

	1850-2015°	1850-1913	1950-2015°
Panel A: Industrials			
dg_t	-0.17***	-0.38***	-0.11*
	(-3.62)	(-3.13)	(-1.87)
	9.99%	23.65%	4.84%
r_t	-0.01	-0.07	0.05
	(-0.19)	(-1.49)	(0.89)
	0.3%	2.11%	1.23%
dy_t	0.87	0.72	0.87
	(16.85)	(5.21)	(12.87)
Panel B: Financials			
dg_t	-0.16***	-0.48***	-0.04
	(-2.21)	(-3.36)	(-0.58)
	5.92%	33.05%	0.42%
r_t	0.09	0.00	0.14*
	(1.67)	(0.01)	(1.87)
	2.37%	0.00%	4.48%
dy_t	0.77	0.55	0.84
	(11.40)	(3.41)	(15.16)
Panel C: Transportation			
dg_t	-0.29***	-0.40***	-0.40***
	(-2.40)	(-2.04)	(-2.18)
	6.39%	8.43%	16.48%
r_t	0.11	-0.00	0.08
	(1.18)	(-0.03)	(0.70)
	1.20%	0.00%	1.60%
dy_t	0.63	0.62	0.54
	(7.17)	(5.35)	(2.27)

This table reports slope coefficients of annual value-weighted log returns (*r*), log dividend growth rates (*dg*), and log dividend yields (*dy*) on lagged log dividend yields of industry portfolios. Dividends are calculated without reinvestment and are in real terms. The figures in parentheses denote the *t-statistics* of the respective slope coefficients, based on the Hodrick (1992) standard errors. Each third line reports R-squared. We exclude the periods 1914–1923 and 1940–1949 from the 1850–2015 period. For *Transportation*, the post–World War II period includes only the 1950–1990 period, which is indicated by the superscript °.

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

Table A8: Equity duration

		Without reinvestment				With reinvestment			
Panel A: Aggregate market									
		β^H	β^L	$\bar{R}^2$	F	β^H	β^L	$\bar{R}^2$	F
	Nominal	-0.02	-0.07	6.80%	52.99	0.10	0.04	7.08%	54.53
		(-0.16)	(-0.55)			(0.59)	(0.28)		
1850-1913		[3.15]***				[3.14]***			
	Real	0.07	0.01	2%	43.10	0.24	0.10	4.58%	47.77
		(0.47)	(0.07)			(1.18)	(0.65)		
		[3.61]***				[3.61]***			
	Nominal	0.23***	0.28	4.23%	51.88	0.34***	0.25***	7.95%	56.69
		(2.12)	(1.49)			(2.66)	(2.21)		
1950-2015		[1.55]				[0.64]			
	Real	0.23***	0.20	2.15%	28.00	0.36***	0.16	5.98%	31.43
		(2.12)	(0.94)			(2.72)	(1.36)		
		[1.96]*				[1.12]			
	Nominal	0.14	0.14	1.07%	73.45	0.30***	0.07	3.97%	80.76
		(1.17)	(1.16)			(2.49)	(0.63)		
1850-2015		[4.40]***				[1.84]*			
	Real	0.16	0.04	0.68%	51.05	0.31***	0.05	4.73%	60.70
		(1.49)	(0.38)			(2.66)	(0.49)		
		[4.50]***				[2.29]***			
Panel B: Large-caps									
	Nominal	0.01	0.10	3.92%	66.48	0.19	0.17	7.27%	67.68
		(0.07)	(1.04)			(1.53)	(1.73)		
1850-1913		[2.47]***				[2.45]***			
	Real	0.09	0.05	-0.51%	22.77	0.09	0.08	0.58%	2.42
		(1.01)	(0.81)			(1.42)	(1.30)		
		[-3.33]***				[-3.34]***			
	Nominal	0.22***	0.30	4.31%	52.49	0.33***	0.22***	4.31%	52.49
		(2.02)	(1.63)			(2.52)	(2.11)		
1950-2015		[1.51]				[0.59]			
	Real	0.22***	0.21	2.10%	28.43	0.35***	0.14	5.38%	30.31
		(2.02)	(1.05)			(2.58)	(1.30)		
		[1.91]*				[1.06]			
	Nominal	0.13	0.20*	1.43%	86.04	0.30***	0.11	4.70%	90.32
		(1.06)	(1.92)			(2.50)	(1.11)		
1850-2015		[-0.56]				[-0.57]			
	Real	0.16	0.10	0.84%	59.38	0.32***	0.08	5.59%	68.34
		(1.40)	(0.98)			(2.70)	(0.87)		
		[4.12]***				[1.97]*			
Panel C: Small-caps									
	Nominal	0.01	-0.03	2.44%	5.40	0.03	-0.03	2.30%	5.28
		(0.34)	(-0.71)			(0.65)	(-0.57)		
1850-1913		[2.65]***				[2.65]***			
	Real	0.00	0.05	-0.51%	22.77	0.02	-0.02	-0.21%	3.43
		(0.04)	(0.81)			(0.30)	(-0.48)		
		[-3.33]***				[3.00]***			
	Nominal	0.11***	0.06	2.65%	26.10	0.09*	0.07*	4.69%	25.77
		(2.68)	(1.42)			(1.80)	(1.82)		
1950-2015		[0.91]				[0.29]			
	Real	0.07*	0.09*	0.56%	8.91	0.09*	0.05	2.81%	9.69
		(1.74)	(1.81)			(1.92)	(1.28)		
		[1.45]				[0.88]			
	Nominal	-0.02	0.04	0.31%	3.63	-0.02	0.03	-1.43%	1.74
		(-0.46)	(1.29)			(-0.30)	(1.05)		
1850-2015		[4.06]***				[2.47]***			
	Real	-0.03	0.03	-0.94%	2.29	-0.02	0.03	-1.52%	1.41
		(-0.47)	(0.85)			(-0.36)	(0.90)		
		[3.40]***				[2.79]***			

This table reports slope coefficients of the regressions of the log expected returns on lagged log dividend yield and a duration dummy as an interaction term: $r_{t+1} = (\alpha + \beta^H dy_t)\, I_t + (\alpha + \beta^L dy_t)\,(1 - I_t) + \varepsilon^r_{t+1}$. The duration dummy equals 1 if the current duration is higher than the duration average, with duration calculated as $1 - dy_t \sum_{n=1}^{10} \left(\frac{1+\bar{g}}{1+\bar{r}}\right)^n$. The superscript "H" indicates a year is of high duration and the superscript "L" indicates a year is of low duration. Real data are obtained by deflating the nominal data by Belgian CPI. The figure in parentheses denotes the *t-stiatistcs* of the slope coefficients based on Hodrick (1992) standard errors. R^2 is the adjusted R-squared and F is the F-statistic. In brackets are paired sample t-tests for the difference in mean. We exclude the war years 1914–1923 and 1940–1949 from the 1850–2015 period.

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

Table A9: Equity duration: robustness checks

Panel A: 5-year window

		Without reinvestment				With reinvestment			
		β^H	β^L	$\bar{R}^2$	F	β^H	β^L	$\bar{R}^2$	F
Aggregate	Nominal	0.54***	0.01	15.25%	62.48	0.41***	0.25***	9.71%	54.72
		(4.11)	(0.13)			(3.09)	(2.40)		
	Real	0.51***	0.02	11.70%	31.26	0.43***	0.17	8.34%	30.78
		(3.31)	(0.15)			(3.12)	(1.55)		
Large-caps	Nominal	0.53***	0.00	15.82%	64.59	0.40***	0.23***	9.26%	52.29
		(4.37)	(0.06)			(3.02)	(2.29)		
	Real	0.50***	0.01	12.20%	32.75	0.43***	0.15	8.02%	29.61
		(3.50)	(0.07)			(3.05)	(1.48)		
Small-caps	Nominal	0.07***	0.09	5.33%	28.82	0.08***	0.03	6.81%	28.25
		(2.53)	(1.59)			(2.42)	(0.96)		
	Real	0.08***	0.06	2.97%	15.63	0.08***	0.05*	4.39%	12.41
		(3.03)	(1.07)			(2.45)	(1.76)		

Panel B: 15-year window

		Without reinvestment				With reinvestment			
		β^H	β^L	$\bar{R}^2$	F	β^H	β^L	$\bar{R}^2$	F
Aggregate	Nominal	0.21*	0.13	2.62%	46.56	0.28***	0.18	6.03%	49.49
		(1.81)	(0.66)			(2.16)	(1.55)		
	Real	0.22*	0.01	0.49%	22.84	0.30***	0.09	3.71%	25.88
		(1.80)	(0.02)			(2.22)	(0.78)		
Large-caps	Nominal	0.20*	0.14	2.24%	46.74	0.27***	0.17	5.05%	48.01
		(1.72)	(0.75)			(2.03)	(1.59)		
	Real	0.21*	0.02	0.20%	22.90	0.29***	0.09	2.89%	25.35
		(1.70)	(0.10)			(2.09)	(0.81)		
Small-caps	Nominal	0.09**	0.03	2.71%	27.01	0.06	0.02	7.53%	30.49
		(2.23)	(0.58)			(1.12)	(0.49)		
	Real	0.05	0.05	-0.06%	6.84	0.07	0.00	4.33%	9.76
		(1.30)	(0.91)			(1.25)	(0.05)		

Panel C: 20-year window

		Without reinvestment				With reinvestment			
		β^H	β^L	$\bar{R}^2$	F	β^H	β^L	$\bar{R}^2$	F
Aggregate	Nominal	0.28*	0.05	7.42%	47.18	0.34***	0.15	9.28%	45.66
		(1.82)	(0.28)			(1.99)	(0.89)		
	Real	0.29*	-0.09	5.71%	24.34	0.37***	0.05	7.46%	23.29
		(1.90)	(-0.45)			(2.13)	(0.30)		
Large-caps	Nominal	0.27*	0.03	7.36%	47.33	0.31*	0.13	8.06%	43.83
		(1.78)	(0.22)			(1.88)	(0.86)		
	Real	0.29*	-0.09	5.72%	24.71	0.34***	0.04	6.30%	25.52
		(1.85)	(-0.52)			(2.01)	(0.28)		
Small-caps	Nominal	0.08***	0.03	0.97%	24.35	0.04	0.04	4.80%	39.56
		(2.07)	(0.69)			(0.92)	(0.88)		
	Real	0.05	0.04	-2.31%	5.49	0.06	0.00	1.77%	10.52
		(1.09)	(1.16)			(1.22)	(0.02)		

This table reports slope coefficients of the regressions of the log expected returns on lagged log dividend yield and a duration dummy as an interaction term: $r_{t+1} = (\alpha + \beta^H dy_t)\, I_t + (\alpha + \beta^L dy_t)\,(1 - I_t) + \varepsilon^r_{t+1}$. The duration dummy equals 1 if the current duration is higher than the duration average, with duration calculated as $1 - dy_t \sum_{n=1}^{x} \left(\frac{1+\bar{g}}{1+\bar{r}}\right)^n$, with x equal to 5, 10, and 15 years. The superscript "H" indicates a year is of high duration and the superscript "L" indicates a year is of low duration. Real data are obtained by deflating the nominal data by Belgian CPI. The figure in parentheses denotes the *t*-statistics of slope coefficients based on Hodrick (1992) standard errors. R^2 is the adjusted R-squared and F is the F-statistic. In brackets are paired sample t-tests for the difference in mean. We focus on the 1950–2015 period.

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

Table A10: Long-run dividend growth and return predictability

Dividend growth predictability

	Without reinvestment				With reinvestment			
	1850-1913		1950-2015		1850-1913		1950-2015	
k	dy_t	R^2	dy_t	R^2	dy_t	R^2	dy_t	R^2
Panel A: Nominal terms								
1	-0.47***	42.29%	-0.36***	29.14%	-0.44***	29.85%	-0.02	0.07%
	(-7.25)		(-3.19)		(-4.62)		(-0.28)	
2	-0.86***	56.01%	-0.34***	15.99%	-0.74***	49.01%	0.02	0.00%
	(-6.47)		(-2.42)		(-4.71)		(0.33)	
5	-1.20***	50.99%	-0.20	2.04%	-0.92***	36.88%	0.08	0.01%
	(-6.15)		(-1.27)		(-3.94)		(0.54)	
10	-1.23***	72.08%	0.17	1.67%	-1.08***	63.45%	0.43***	8.66%
	(-7.94)		(0.65)		(-6.32)		(2.54)	
15	-1.00***	45.36%	0.20	2.17%	-0.77***	32.84%	0.41	5.41%
	(-4.74)		(0.65)		(-2.96)		(1.18)	
20	-1.26***	63.25%	0.60***	10.49%	-1.06***	52.00%	0.72***	13.11%
	(-9.09)		(4.26)		(-7.26)		(3.90)	
Panel B: Real terms								
1	-0.41***	38.81%	-0.38***	23.15%	-0.38***	24.75%	-0.05	0.30%
	(-7.16)		(-4.35)		(-4.33)		(-0.58)	
2	-0.73***	50.56%	-0.26***	20.48%	-0.61***	39.37%	-0.11	3.01%
	(-5.23)		(-3.64)		(-3.98)		(-0.45)	
5	-1.03***	46.12%	-0.34***	17.15%	-0.75***	30.00%	-0.25	8.92%
	(-7.64)		(-3.14)		(-4.88)		(-2.03)	
10	-1.19***	68.05%	-0.48*	19.02%	-1.05***	58.87%	-0.38	12.77%
	(-16.96)		(-1.78)		(-10.64)		(-1.70)	
15	-0.97***	38.74%	-0.59**	18.88%	-0.74***	25.07%	-0.49	12.05%
	(-7.34)		(-2.04)		(-4.52)		(-1.53)	
20	-1.18***	45.01%	-0.24	1.55%	-0.97***	35.12%	-0.13	0.00%
	(-6.25)		(-0.68)		(-7.07)		(-0.42)	

Return predictability

	Without reinvestment				With reinvestment			
	1850-1913		1950-2015		1850-1913		1950-2015	
k	dy_t	R^2	dy_t	R^2	dy_t	R^2	dy_t	R^2
Panel A: Nominal terms								
1	-0.12***	7.45%	0.24***	10.12%	-0.11*	4.37%	0.33***	12.26%
	(-2.17)		(3.13)		(-1.74)		(3.83)	
2	-0.18***	7.12%	0.38***	13.41%	-0.18**	7.08%	0.41***	17.05%
	(-2.13)		(3.51)		(-2.13)		(3.52)	
5	-0.00	0.00%	0.68***	21.11%	0.00	0.00%	0.69***	21.01%
	(-0.01)		(3.22)		(0.02)		(3.16)	
10	0.21***	8.12%	1.47***	45.09%	0.21***	9.36%	1.51***	46.85%
	(5.34)		(5.32)		(5.71)		(5.24)	
15	0.15	5.46%	1.65***	38.00%	0.15	5.12%	1.69***	39.47%
	(1.52)		(3.12)		(1.50)		(3.15)	
20	-0.07	1.88%	2.04***	34.01%	-0.07	1.01%	2.04***	33.66%
	(-0.56)		(5.81)		(-0.57)		(3.46)	
Panel B: Real terms								
1	-0.06	1.65%	0.22***	7.87%	-0.04	0.58%	0.30***	9.94%
	(-0.91)		(2.57)		(-0.60)		(3.31)	
2	-0.05	0.00%	0.33***	9.01%	-0.05	0.00%	0.34***	10.55%
	(-0.41)		(2.89)		(-0.44)		(2.93)	
5	0.17	3.62%	0.57***	13.45%	0.17	3.11%	0.59***	13.52%
	(1.01)		(3.09)		(1.01)		(3.04)	
10	-0.17	4.05%	1.39***	34.97%	-0.18	4.28%	1.43***	35.84%
	(-3.91)		(5.44)		(-4.12)		(5.37)	
15	-0.18	4.01%	1.70***	34.41%	-0.19	4.01%	1.74***	34.73%
	(-2.71)		(2.63)		(-2.70)		(2.66)	
20	0.02	0.01%	2.56***	41.86%	0.02	0.08%	2.58***	42.00%
	(0.23)		(6.30)		(0.21)		(6.40)	

This table reports slope coefficients of the long-run horizon regressions of log dividend growth rates and log return on lagged log dividend yields in real terms with k as the horizon, adjusted for a structural break. Real data are obtained by deflating the nominal data by Belgian CPI. The figures in parentheses denote the *t*-statistics of the respective slope coefficients, based on the Hodrick (1992) standard errors. In every second column, R^2 denotes the R-squared value. All regressions include a constant (not reported). We exclude the war years 1914–1923 and 1940–1949 from the 1850–2015 period.

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

Table A11: Dividend growth and return predictability: VAR regressions

	Without reinvestment			With reinvestment		
	1850-1913	1950-1986	1987-2015	1850-1913	1950-1986	1987-2015
Panel A: Dividend growth						
Panel A1: Nominal data						
dp_t	-0.47	-0.18	-0.49	-0.44	-0.02	-0.09
Implied coefficient	-0.17	-0.18	-0.48	-0.44	-0.01	-0.09
p-value (Hodrick)	(0.00)	(0.12)	(0.01)	(0.00)	(0.87)	(0.48)
p-value (sim. direct)	(0.00)	(0.07)	(0.00)	(0.00)	(0.56)	(0.37)
Long-run coefficient	-1.33	-0.52	-0.63	-1.32	-0.06	-0.20
p-value (delta method)	(0.00)	(0.05)	(0.00)	(0.00)	(0.89)	(0.63)
p-value (sim. direct)	(0.00)	(0.03)	(0.00)	(0.00)	(0.55)	(0.34)
Panel A2: Real data						
dp_t	-0.41	-0.24	-0.48	-0.38	-0.06	-0.09
Implied coefficient	-0.41	-0.24	-0.47	-0.38	-0.06	-0.08
p-value (Hodrick)	(0.00)	(0.05)	(0.00)	(0.00)	(0.60)	(0.49)
p-value (sim. direct)	(0.00)	(0.02)	(0.00)	(0.00)	(0.44)	(0.37)
Long-run coefficient	-1.18	-0.68	-0.63	-1.13	-0.20	-0.19
p-value (delta method)	(0.00)	(0.03)	(0.00)	(0.00)	(0.64)	(0.64)
p-value (sim. direct)	(0.00)	(0.01)	(0.00)	(0.00)	(0.40)	(0.34)
Panel B: Returns						
Panel B1: Nominal data						
dp_t	-0.12	0.17	0.28	-0.11	0.28	0.37
Implied coefficient	-0.12	0.17	0.28	-0.11	0.28	0.37
p-value (Hodrick)	(0.04)	(0.12)	(0.01)	(0.09)	(0.01)	(0.02)
p-value (sim. direct)	(0.01)	(0.16)	(0.05)	(0.05)	(0.04)	(0.09)
Long-run coefficient	-0.33	0.49	0.37	-0.32	0.95	0.80
p-value (delta method)	(0.12)	(0.06)	(0.01)	(0.17)	(0.04)	(0.06)
p-value (sim. direct)	(0.01)	(0.08)	(0.04)	(0.04)	(0.01)	(0.05)
Panel B2: Real data						
dp_t	-0.06	0.12	0.29	-0.04	0.24	0.37
Implied coefficient	-0.06	0.11	0.29	-0.05	0.24	0.37
p-value (Hodrick)	(0.35)	(0.29)	(0.01)	(0.55)	(0.04)	(0.02)
p-value (sim. direct)	(0.12)	(0.29)	(0.05)	(0.76)	(0.08)	(0.09)
Long-run coefficient	-0.18	0.33	0.37	-0.13	0.81	0.81
p-value (delta method)	(0.40)	(0.26)	(0.01)	(0.58)	(0.07)	(0.06)
p-value (sim. direct)	(0.12)	(0.22)	(0.04)	(0.23)	(0.03)	(0.05)

This table reports slope coefficients of annual value-weighted log dividend growth rates (*dg*), log returns (*r*), and log adjusted dividend yields (*dy*) on lagged log adjusted dividend yields. Implied coefficients are calculated via the identity: $\rho\phi - \beta^{dg} + \beta^{r} = 1$ with $\rho = \frac{1}{(1+\exp(dy))}$. *p*-values are based on Hodrick (1992) corrections, *p*-value (Hodrick) or Monte Carlo simulations, *p*-value (sim. direct). The long-run coefficient is implied from $\frac{\beta^{r}}{(1-\rho\phi)}$ and $\frac{\beta^{dg}}{(1-\rho\phi)}$ for, respectively, the return and dividend growth coefficient. *p*-values are based on the delta method, *p*-value (delta method) or Monte Carlo simulations, *p*-value (sim. direct). All regressions include a constant. Real data are obtained by deflating the nominal data by Belgian CPI.

Table A12: Dividend growth and return predictability: risk-free rate

		Without reinvestment				With reinvestment			
Panel A: $dg_{t+1} = \alpha + \beta^{dy} dy_t + \beta^{rf}\, rf_t + \varepsilon^{dg}_{t+1}$									
		dy_t	rf_t	$\bar{R}^2$	F	${dy_t}^{RE}$	rf_t	$\bar{R}^2$	F
1850-2015	Nominal	-0.46***	1.94***	26.38%	38.83	-0.23***	1.23**	3.88%	5.43
		(-6.97)	(4.47)			(-2.28)	(1.95)		
	Real	-0.24***	-0.32	24.19%	35.19	-0.10**	-0.24	1.86%	3.52
		(-5.67)	(-1.49)			(-1.86)	(-0.79)		
1850-1913	Nominal	-0.52***	5.89***	47.63%	61.01	-0.49***	4.47***	32.66%	29.82
		(-7.79)	(2.82)			(-5.10)	(2.11)		
	Real	-0.45***	-0.64***	38.40%	51.96	-0.43***	-0.50	26.55%	21.68
		(-6.90)	(-2.14)			(-4.63)	(-1.59)		
1950-2015	Nominal	-0.19***	0.56	15.08%	8.65	-0.04	0.05	-2.67%	0.38
		(-2.57)	(0.93)			(-0.51)	(0.06)		
	Real	-0.19***	-0.46	21.76%	13.44	-0.06	-0.35	0.00%	1.70
		(-3.35)	(-0.98)			(-1.04)	(-0.50)		
Panel B: $er_{t+1} = \alpha + \beta^{dy} dy_t + \beta^{rf}\, rf_t + \varepsilon^{er}_{t+1}$									
		dy_t	rf_t	$\bar{R}^2$	F	${dy_t}^{RE}$	rf_t	$\bar{R}^2$	F
1850-2015	Nominal	0.03	-0.25	0.00%	0.40	0.06	-0.34	0.00%	1.03
		(0.61)	(-0.43)			(1.01)	(-0.57)		
	Real	0.03	-0.01	0.00%	0.32	0.05	-0.02	0.00%	0.92
		(0.55)	(-0.08)			(0.94)	(-0.11)		
1850-1913	Nominal	-0.09	-2.82***	8.59%	8.60	-0.06	-3.28***	7.13%	7.82
		(-1.53)	(-2.10)			(-0.98)	(-2.23)		
	Real	-0.1	0.12	2.98%	4.31	-0.09	0.12	0.86%	2.41
		(-1.51)	(0.54)			(-1.51)	(0.53)		
1950-2015	Nominal	0.33***	-1.96***	9.48%	11.38	0.50***	-2.48***	13.59%	18.27
		(3.36)	(-2.45)			(4.24)	(-3.27)		
	Real	0.19**	-0.48	2.11%	3.78	0.28***	-0.76	3.59%	7.74
		(1.94)	(-0.66)			(2.78)	(-1.06)		

This table reports slope coefficients of regressions of the one-year-ahead log dividend growth rates (*dg*), log excess returns (*r*), and log inflation on lagged log dividend yields (*dy*) and log risk-free rate (*rf*). The risk-free rate is a compiled annual rate. Real data are obtained by deflating the nominal data by Belgian CPI. The superscript "*re*" indicates variables are computed with monthly dividends reinvested at the market rate of return within each year. The number in parentheses denotes the *t*-statistics of the slope coefficients based on Hodrick (1992) standard errors. R^2 is the adjusted R-squared and F is the F-statistic. We exclude the war years 1914–1923 and 1940–1949 for the 1850–2015 period.

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

Table A13: Dividend growth and return predictability: term spread

Panel A: $dg_{t+1} = \alpha + \beta^{dy} dy_t + \beta^{TS}\, TS_t + \varepsilon^{dg}_{t+1}$

		Without reinvestment				With reinvestment			
		dy_t	TS_t	$\bar{R}^2$	F	dy_t^{RE}	TS_t	$\bar{R}^2$	F
1850-2015	Nominal	-0.26***	0.01	27.79%	34.97	-0.13***	0.02*	12.91%	10.22
		(-5.84)	(0.91)			(-2.38)	(1.66)		
	Real	-0.25***	0.00	25.00%	36.37	-0.11**	-0.00	2.77%	4.68
		(-5.78)	(0.35)			(-1.88)	(-0.38)		
1850-1913	Nominal	-0.53***	-0.02	51.15%	51.15	-0.51***	-0.02	41.48%	28.19
		(-6.83)	(-1.06)			(-4.91)	(-0.72)		
	Real	-0.45***	-0.01	38.95%	47.27	-0.44***	0.00	26.17%	20.77
		(-6.69)	(-0.62)			(-4.50)	(-0.29)		
1950-2015	Nominal	-0.16***	0.01	16.25%	8.45	-0.05	0.02*	4.20%	4.11
		(-2.86)	(0.83)			(-0.78)	(1.83)		
	Real	-0.22***	0.01	24.38%	16.36	-0.05	-0.01	-0.04%	2.06
		(-3.94)	(0.93)			(-0.69)	(-0.41)		

Panel B: $r_{t+1} = \alpha + \beta^{dy} dy_t + \beta^{TS}\, TS_t + \varepsilon^{r}_{t+1}$

		Without reinvestment				With reinvestment			
		dy_t	TS_t	$\bar{R}^2$	F	dy_t^{RE}	TS_t	$\bar{R}^2$	F
1850-2015	Nominal	0.07	0.02*	7.91%	5.22	0.05	0.02***	8.3%	5.61
		(0.99)	(1.90)			(0.98)	(2.10)		
	Real	0.05	0.00	3.53%	3.93	0.08	0.00	4.36%	4.08
		(1.00)	(-0.25)			(1.26)	(-0.38)		
1850-1913	Nominal	-0.08	0.02*	10.30%	7.72	-0.07	0.02*	9.67%	6.44
		(-1.69)	(1.88)			(-1.29)	(1.98)		
	Real	-0.03	0.00	8.79%	5.42	-0.02	0.00	8.46%	4.86
		(-0.60)	(0.84)			(-0.31)	(0.84)		
1950-2015	Nominal	0.30***	0.02***	17.62%	19.53	0.41***	0.03***	21.21%	22.83
		(3.68)	(2.54)			(4.38)	(2.45)		
	Real	0.28***	0.02***	15.68%	15.23	0.39***	0.03***	19.43%	18.61
		(3.17)	(2.32)			(3.90)	(2.26)		

This table reports slope coefficients of regressions of the one-year-ahead log dividend growth rates (*dg*) and log expected returns (*r*) on lagged log dividend yields (*dy*) and long-term spread (*TS*). The term spread is calculated as the difference between long-term and short-term government bonds. Real data are obtained by deflating the nominal data by Belgian CPI. The superscript "*re*" indicates variables are computed with dividends reinvested at the market rate of return, within each year. The number in parentheses denotes the *t*-statistics of the slope coefficients based on Hodrick (1992) standard errors. R^2 is the adjusted R-squared and F is the F-statistic. We exclude the war years 1914–1923 and 1940–1949 from the 1850–2015 period.

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

Table A14: Dividend growth and return predictability: recession dummy

Panel A: $dg_{t+1} = \alpha + \beta^{dy} dy_t + \beta^{I} I_t + \varepsilon_{t+1}^{dg}$

		Without reinvestment				With reinvestment			
		dy_t	I_t	$\bar{R}^2$	F	${dy_t}^{\mathrm{RE}}$	I_t	$\bar{R}^2$	F
1850-2015	Nominal	-0.20***	-0.10**	30.29%	44.39	-0.09	-0.08***	6.68%	10.59
		(-4.57)	(-4.31)			(-1.55)	(-2.71)		
	Real	-0.20***	-0.09***	29.17%	42.21	-0.09*	-0.06***	5.20%	8.07
		(-4.76)	(-3.72)			(-1.68)	(-2.14)		
1850-1913	Nominal	-0.42***	-0.09***	44.82%	55.28	-0.44***	-0.08***	33.88%	26.33
		(-5.77)	(-2.88)			(-4.41)	(-2.42)		
	Real	-0.39***	-0.06*	37.55%	47.19	-0.39***	-0.048	25.98%	20.58
		(-5.72)	(-1.93)			(-.4.22)	(-1.44)		
1950-2015	Nominal	-0.14***	-0.05	16.07%	8.53	-0.03	-0.03	-2.02%	0.85
		(-2.65)	(-1.41)			(-0.43)	(-0.70)		
	Real	-0.17***	-0.05	23.09%	13.14	-0.06	-0.03	-0.01%	1.86
		(-3.36)	(-1.45)			(-0.96)	(-0.74)		

Panel B: $r_{t+1} = \alpha + \beta^{dy} dy_t + \beta^{I} I_t + \varepsilon_{t+1}^{r}$

		Without reinvestment				With reinvestment			
		dy_t	I_t	$\bar{R}^2$	F	${dy_t}^{\mathrm{RE}}$	I_t	$\bar{R}^2$	F
1850-2015	Nominal	0.06	-0.05	0.77%	3.67	0.08	-0.05	1.55%	3.91
		(1.17)	(-1.71)			(1.41)	(-1.63)		
	Real	0.06	-0.04	0.11%	2.49	0.08	-0.03	0.62%	2.53
		(1.25)	(-1.16)			(1.35)	(-1.06)		
1850-1913	Nominal	-0.09**	-0.01	3.30%	4.49	-0.08	-0.02	1.71%	2.89
		(-1.96)	(-0.65)			(-1.45)	(-0.95)		
	Real	-0.58	0.02	-1.98%	1.63	-0.04	0.01	-2.78%	0.60
		(-1.08)	(0.64)			(-0.61)	(0.40)		
1950-2015	Nominal	0.29***	-0.05	8.17%	10.01	0.32***	-0.02	8.00%	15.75
		(2.82)	(-0.73)			(3.20)	(-0.37)		
	Real	0.26***	-0.04	5.46%	6.86	0.31***	-0.02	6.05%	11.34
		(2.37)	(0.57)			(2.84)	(-0.31)		

This table reports slope coefficients of regressions of the one-year-ahead log dividend growth rates (*dg*) and log expected returns (*r*) on lagged log dividend yield (*dy*) and a recession dummy I_t. The recession dummy equals 1 if a year has at least two quarters of negative real GDP growth (post–World War II) or a negative annual real GDP growth (pre–World War II), and 0 otherwise. Real data are obtained by deflating the nominal data by Belgian CPI. The superscript "*re*" indicates variables are computed with dividends reinvested at the market rate of return within each year. The number in parentheses denotes the *t*-statistics of the slope coefficients based on Hodrick (1992) standard errors. R^2 is the adjusted R-squared and F is the F-statistic. We exclude the war years 1914–1923 and 1940–1949 from the 1850–2015 period.

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

Table A15: Dividend growth and return predictability: recession-switching dummy

Panel A: $dg_{t+1} = (\alpha + \beta^R dy_t)\, I_t + (\alpha + \beta^E dy_t)\,(1 - I_t) + \varepsilon_{t+1}^{dg}$

		Without reinvestment				With reinvestment			
		β^R	β^E	$\bar{R}^2$	F	β^R	β^E	$\bar{R}^2$	F
1850-2015	Nominal	-0.25***	-0.17***	30.28%	59.56	-0.07	-0.09*	6.67%	10.31
		(-2.91)	(-3.55)			(-1.26)	(-1.72)		
		[-1.35]				[-1.35]			
	Real	-0.28***	-0.15***	29.97%	47.67	-0.08	-0.10*	5.10%	7.65
		(-3.41)	(-3.38)			(-1.46)	(-1.82)		
		[-1.03]				[-1.02]			
1850-1913	Nominal	-0.55***	-0.37***	44.84%	62.17	-0.42***	-0.44***	33.55%	26.21
		(-4.08)	(-4.27)			(-4.17)	(-4.45)		
		[-1.74]*				[-2.15]*			
	Real	-0.55***	-0.32***	38.37%	59.61	-0.39***	-0.40***	25.71%	20.48
		(-3.88)	(-4.19)			(-4.04)	(-4.24)		
		[-1.47]				[-1.84]*			
1950-2015	Nominal	-0.17*	-0.12***	14.93%	24.14	-0.02	-0.03	-0.18%	0.92
		(-1.57)	(-2.23)			(-0.28)	(-0.48)		
		[0.51]				[1.14]			
	Real	-0.21***	-0.15***	22.44%	15.87	-0.05	-0.06	-0.44%	1.89
		(-2.12)	(-2.69)			(-0.79)	(-1.03)		
		[0.16]				[0.80]			

Panel B: $r_{t+1} = (\alpha + \beta^R dy_t)\, I_t + (\alpha + \beta^E dy_t)\,(1 - I_t) + \varepsilon_{t+1}^{r}$

		Without reinvestment				With reinvestment			
		β^R	β^E	$\bar{R}^2$	F	β^R	β^E	$\bar{R}^2$	F
1850-2015	Nominal	0.32***	-0.10	9.38%	88.69	0.31***	0.01	6.48%	90.42
		(3.70)	(-1.19)			(3.55)	(0.11)		
		[-8.87]***				[-8.87]***			
	Real	0.30***	-0.06	6.86%	59.17	0.28***	0.04	4.45%	62.02
		(3.15)	(-0.83)			(2.88)	(0.55)		
		[-3.33]***				[-3.34]***			
1850-1913	Nominal	-0.21***	-0.04	4.79%	32.16	-0.08	-0.08	1.56%	2.79
		(-2.44)	(-0.83)			(-1.39)	(-1.49)		
		[-4.83]***				[-4.84]***			
	Real	-0.22***	0.01	13.95%	29.10	-0.04	-0.04	-2.69%	0.72
		(-2.14)	(0.14)			(-0.68)	(-0.61)		
		[-3.12]***				[-3.16]***			
1950-2015	Nominal	0.57***	0.08	14.22%	70.96	0.50***	0.22*	10.09%	53.95
		(3.51)	(0.75)			(2.64)	(1.97)		
		[-6.72]***				[-3.01]***			
	Real	0.54***	0.04	11.57%	38.95	0.46***	0.20*	7.11%	30.63
		(3.20)	(0.38)			(2.29)	(1.77)		
		[-6.86]***				[-3.12]***			

This table reports slope coefficients of regressions of the one-year-ahead log dividend growth rates (*dg*) and log expected returns (*r*) on lagged log dividend yield (*dy*) and a recession dummy I_t. The recession dummy equals 1 if a year has at least two quarters of negative real GDP growth (for post–World War II) or a negative annual real GDP growth (for pre–World War II), and 0 otherwise. The superscript "R" indicates a recession, the superscript "E" indicates an expansion. Real data are obtained by deflating the nominal data by Belgian CPI. The number in parentheses denotes the *t*-statistics of the slope coefficients based on Hodrick (1992) standard errors. R^2 is the adjusted R-squared and F is the F-statistic. In brackets are paired sample t-tests for the difference in mean. We exclude the war years 1914–1923 and 1940–1949 from the 1850-2015 period.

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

Table A16: Dividend growth and return predictability: dividend volatility

Panel A: $dg_{t+1} = \alpha + \beta^{dy} dy_t + \beta^V vol_t + \varepsilon_{t+1}$

		Without reinvestment				With reinvestment			
		β^{dy}	β^V	$\bar{R}^2$	F	β^{dy}	β^V	$\bar{R}^2$	F
1850-2015	Nominal	-0.28***	-0.02	25.24%	45.39	-0.13***	-0.00	3.70%	7.47
		(-6.50)	(-0.96)			(-2.72)	(-0.03)		
	Real	-0.27***	-0.02	26.48%	50.33	-0.13***	-0.00	3.94%	8.10
		(-6.84)	(-1.03)			(-2.83)	(-0.04)		
1850-1913	Nominal	-0.51***	0.04***	43.81%	66.77	-0.51***	0.04*	31.01%	24.49
		(-8.15)	(2.02)			(-4.92)	(1.75)		
	Real	-0.47***	0.05***	43.61%	84.03	-0.46***	0.05	28.74%	21.12
		(-8.97)	(3.34)			(-4.90)	(2.39)		
1950-2015	Nominal	-0.25***	-0.19**	27.81%	14.38	-0.08	-0.06	-0.92%	2.21
		(-3.38)	(-1.92)			(-1.42)	(-0.99)		
	Real	-0.28***	-0.18*	32.14%	21.21	-0.11*	-0.05	0.43%	3.60
		(-3.88)	(-1.87)			(-1.90)	(-0.80)		

Panel B: $r_{t+1} = \alpha + \beta^{dy} dy_t + \beta^V vol_t + \varepsilon_{t+1}$

		Without reinvestment				With reinvestment			
		β^{dy}	β^V	$\bar{R}^2$	F	β^{dy}	β^V	$\bar{R}^2$	F
1850-2015	Nominal	0.02	0.03	0.34%	2.93	0.06	0.04	1.08%	5.07
		(0.50)	(1.66)			(1.16)	(1.84)		
	Real	0.03	0.03	0.52%	2.66	0.06	0.04	1.14%	4.29
		(0.76)	(1.51)			(1.20)	(1.65)		
1850-1913	Nominal	-0.14***	0.02	7.67%	5.51	-0.15***	0.03	4.62%	4.32
		(-2.35)	(1.11)			(-2.08)	(1.12)		
	Real	-0.10	0.04	4.05%	2.78	-0.10	0.04	2.77%	2.37
		(-1.48)	(1.30)			(-1.31)	(1.30)		
1950-2015	Nominal	0.12***	0.11	2.61%	6.13	0.14***	0.12	2.55%	5.90
		(2.39)	(1.36)			(2.29)	(1.41)		
	Real	0.10**	0.12	1.59%	3.98	0.11**	0.13	1.54%	4.27
		(1.81)	(1.44)			(1.80)	(1.49)		

This table reports slope coefficients of annual value-weighted log dividend growth rates (*dg*), log returns (*r*) and log dividend yields (*dy*) on lagged log dividend yields, and *vol* is the corresponding dividend growth volatility for the past 12 months. "With reinvestment" indicates the variable is computed with monthly dividends reinvested at the market rate of return within each year. The numbers in parentheses denotes the *t*-statistics of the respective slope coefficients, based on Hodrick (1992) standard error corrections. R^2 is the adjusted R-squared and F is the F-statistic. Real data are obtained by deflating the nominal data by Belgian CPI. We exclude the periods 1914–1923 and 1940–1949 from the 1850-2015 period.

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

Table A17: Out-of-sample regressions

		Without reinvestment			With reinvestment		
		1850-1913	1950-2015	1850-2015	1850-1913	1950-2015	1850-2015
Panel A: Dividend growth rates							
$Theil's\ U$	Nominal	0.77***	0.98***	0.91***	0.88***	1.04	0.96***
		(0.00)	(0.04)	(0.00)	(0.00)	(0.94)	(0.00)
	Real	0.80***	0.97***	0.91***	0.91***	1.03	0.97
		(0.00)	(0.02)	(0.00)	(0.00)	(0.88)	(0.00)
$MSEF$	Nominal	0.29***	0.02***	0.10***	0.14***	-0.04*	0.04***
		(0.00)	(0.04)	(0.00)	(0.00)	(0.94)	(0.01)
	Real	0.25***	0.03***	0.10***	0.10***	-0.03	0.03
		(0.00)	(0.02)	(0.00)	(0.01)	(0.88)	(0.00)
ENC	Nominal	3.12***	0.22	2.88***	1.74***	-0.15	1.29***
		(0.00)	(0.13)	(0.00)	(0.00)	(0.83)	(0.00)
	Real	2.56***	0.38**	2.78***	1.29***	-0.02	1.25
		(0.00)	(0.07)	(0.00)	(0.00)	(0.39)	(0.00)
R^2_{OOS}	Nominal	39.98%	-0.40%	8.59%	22.40%	-11.46%	0.81%
	Real	36.29%	2.08%	9.24%	17.52%	-9.32%	1.21%
Panel B: Returns							
$Theil's\ U$	Nominal	0.99**	0.98***	1.00	1.00	0.98***	1.00
		(0.06)	(0.04)	(0.15)	(0.22)	(0.03)	(0.18)
	Real	1.02	0.99**	1.00	1.02	0.99**	1.00
		(0.75)	(0.07)	(0.13)	(0.78)	(0.06)	(0.19)
$MSEF$	Nominal	0.01**	0.02***	-0.00	-0.00	0.02***	-0.00
		(0.06)	(0.04)	(0.15)	(0.22)	(0.04)	(0.19)
	Real	-0.02	0.01**	0.00	-0.02	0.01**	-0.00
		(0.74)	(0.08)	(0.13)	(0.77)	(0.06)	(0.20)
ENC	Nominal	0.20**	0.26	-0.00	0.07	0.20*	-0.04
		(0.07)	(0.11)	(0.37)	(0.21)	(0.10)	(0.42)
	Real	-0.05	0.13	0.15	-0.09	0.14	-0.03
		(0.63)	(0.19)	(0.27)	(0.82)	(0.17)	(0.41)
R^2_{OOS}	Nominal	2.76%	1.00%	-1.30%	-0.83%	-0.01%	-1.58%
	Real	-4.55%	-0.65%	-0.94%	-5.05%	1.36%	-1.29%

This table reports four metrics to measure the out-of-sample rolling regressions. For expected dividend growth rate and expected returns, we report Theil's U, MSE-F statistic, and ENC statistic. Bootstrapped *p*-values are reported in parentheses. Real data are obtained by deflating the nominal data by Belgian CPI. We exclude the war years 1914–1923 and 1940–1949 from the 1870–2015 period. We use the first 20 years of each period as the initial training period.

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

Table A18: Duration estimates for dividend sorted portfolios

	Value-weighted			Equally weighted		
	1850-1913	1950-2015	1850-2015	1850-1913	1950-2015	1850-2015
Value stocks	0.13	0.30***	0.19***	0.22***	0.15*	0.17***
	(1.32)	(2.40)	(3.90)	(2.70)	(1.62)	(2.53)
Growth stocks	-0.07	-0.26***	-0.11***	-0.17***	-0.12*	-0.17***
	(-0.88)	(-1.97)	(-2.18)	(-1.93)	(-1.71)	(-2.08)

This table reports slope coefficients of duration of monthly value-weighted and equally weighted value stocks and growth stocks. Duration is estimated as the negative of the slope coefficient for changes in yields on long-term Belgian government bonds from regressions of excess stock returns of value and growth stocks on changes in yields and aggregate excess return. At the beginning of January for each year we sort stocks into terciles based on their dividend yield at the end of the preceding year. The bottom tercile are growth stocks and the top tercile are value stocks. The *t*-statistics are in parentheses and calculated following Hodrick (1992) corrections. We exclude the periods 1914–1923 and 1940–1949 from the 1850–2015 period.

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

Table A19: Earnings yield and dividend yield regression

Panel A: Dividend yield

	dy_t	t-statistic	. R^2
dg_t	-0.14***	-2.34	6.00%
eg_t	-0.21***	-2.34	7.19%
r_t	0.10*	1.72	3.37%
dy_t	0.63***	3.12	38.43%

Panel B: Earnings yield

	dy_t	t-statistic	. R^2
dg_t	-0.27*	-1.59	16.56%
eg_t	-0.59***	-3.20	42.16%
r_t	0.17*	1.77	4.65%
ey_t	0.25	1.08	6.07%

This table reports slope coefficients of annual value-weighted log dividend growth (*dg*), log earnings growth (*eg*), log returns (*r*), log dividend yield (*dy*) and log earnings yield (*ey*) on lagged log dividend yield (panel A) and lagged log earnings yield (panel B). *T*-statistics of the respective slope coefficients are based on Hodrick (1992) standard error corrections. R^2 is the R-squared. We use share price, total return, earnings and dividend yield from Datastream. The total sample period runs from 1973 to 2015.

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