

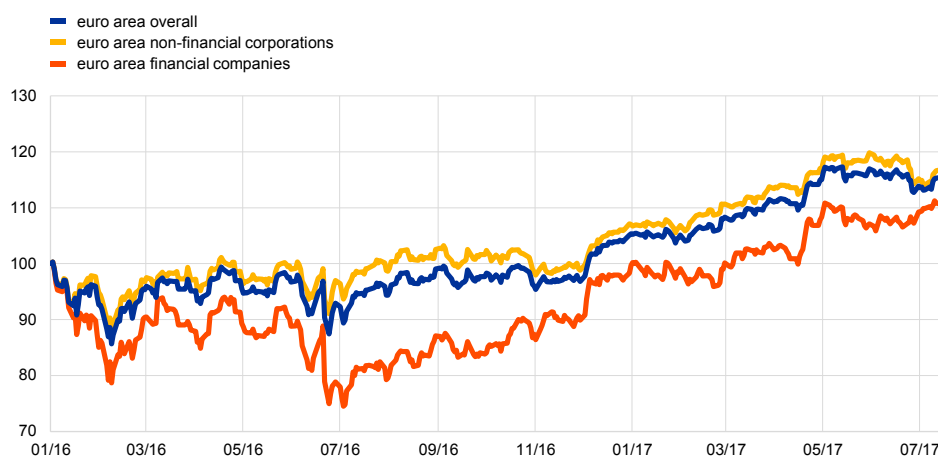
## Recent drivers of euro area equity prices

**Following the trough after the UK referendum on EU membership, equity markets in the euro area have recorded notable gains (see Chart A).** Compared with early July 2016, the increase amounts to around 40% for banks and 20% for non-financial corporations.

### Chart A

#### Euro area equity indices

(1 January 2016 = 100)



Sources: Thomson Reuters DataStream and ECB calculations.  
Note: The latest observation is for 19 July 2017.

**Using a dividend discount model, this box analyses the driving forces behind the increase in equity prices since July 2016.** Dividend discount models allow

changes in equity prices to be broken down into contributions from three factors:

(i) changes in expected future cash flows from equities in the form of dividends;

(ii) changes in the long-term risk-free rate; and (iii) changes in the “equity risk

premium”. The sum of the equity risk premium and the long-term risk-free rate forms the required rate of return on equity at which future dividends are discounted, with the equity risk premium denoting the risk compensation, or extra return, required by investors for holding equity instead of long-term bonds.

**To the extent that expected dividends, long-term risk-free interest rates and equity prices can be observed via financial market data, the equity risk premium can be found by equating the discounted sum of future cash flows to the prevailing stock prices.** The path of future expected dividends, however, is inherently unobservable and would need to be proxied on the basis of observable indicators combined with economically plausible assumptions.

**The dividend discount model is implemented here by assuming that the expected dividend growth rate varies over the course of different phases and converges to a constant long-term value.** In the three-stage model, three separate phases for the dividend growth rate are assumed: (i) an initial period during which dividends grow constantly at a rate of  $g_a$ ; (ii) an intermediate period over which the initial growth rate converges linearly towards a long-term growth rate ( $g_n$ );

and (iii) a final indefinite period, where dividends grow at the constant annual long-term rate ( $g_n$ ). With the current dividend in place, this assumed sequence of growth rates identifies the complete evolution of expected future dividends.

**Under these assumptions on future dividend growth rates, the equity premium can be readily obtained from observed dividend yields and the risk-free rate.** It

is calculated using the expression shown in the equation, which is an approximation of the three-stage dividend discount model, also known as the “H-model”<sup>5</sup>. In the equation,  $r$  denotes the required rate of return on a stock (or stock price index),  $r_f$  the risk-free long-term rate,  $ERP$  the equity risk premium, and  $D_0/P_0$  the current dividend yield, while  $g_a$  and  $g_n$  are the two dividend growth parameters described above. The parameter  $H$  is the length of the initial period (first stage) plus half the length of the intermediate period (second stage). For the implementation of the model, the initial (first stage) dividend growth rate ( $g_a$ ) is approximated by I/B/E/S “long-term” earnings projections<sup>6</sup> and the long-term growth rate ( $g_n$ ) (third stage) by long-term year-on-year GDP growth expectations as reported by Consensus Economics. Stock prices and initial dividends are taken directly from financial markets, while the long-term risk-free rate is gauged to be the ten-year overnight index swap rate. The latter is subtracted from the required rate of return in order to calculate the equity risk premium. Changes to the equity price index can then be broken down into changes in growth expectations (as captured by changes in the  $g$ -parameters), changes in the long-term risk-free rate, or changes in the calculated equity premium.

$$r = r_f + ERP = \frac{D_0}{P_0} [(1 + g_n) + H(g_a - g_n)] + g_n$$

**In cumulative terms, the increase in equity prices between early July 2016 and January 2017 was mainly attributable to a fall in the equity risk premium (see Chart B).** Chart B shows cumulative contributions to the change in euro area equity prices, with positive contributions from declines in the equity risk premium being especially visible around the time of the presidential election in the United States.<sup>7</sup>

**Since early 2017, however, improvements in earnings growth expectations for euro area firms have picked up significantly and become the major driver of the further rise in equity prices.** This increase in earnings expectations has been in line with the overall improvement in the euro area macroeconomic environment, as also signalled by strong readings in, for example, the euro area Citi Economic Surprise Index or Purchasing Managers’ Indices. Over the entire period, the declines in the equity risk premium and subsequent improvements in earnings expectations together more than offset the increase in longer-term yields since autumn 2016.

<sup>5</sup> See Fuller, R.J. and Hsia, C.-C., “A simplified common stock valuation model”, *Financial Analysts Journal*, 40(5), September-October 1984, pp. 49-56.

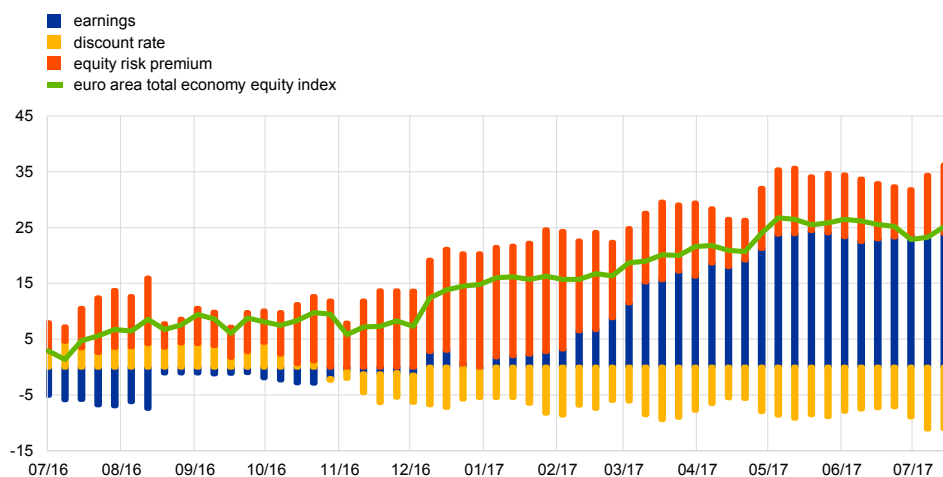
<sup>6</sup> The Institutional Brokers Estimate System (I/B/E/S) provides composite estimates of the anticipated annual growth rate of earnings per share over a period of between three and five years.

<sup>7</sup> A decline in the equity risk premium is reflected in a positive contribution to equity prices in Chart B.

## Chart B

### Dividend discount model decomposition of cumulative changes in euro area equity prices

(weekly data)



Sources: Thomson Reuters and ECB calculations.  
Note: The latest observation is for 14 July 2017.

**From a historical perspective, the current estimate for the equity risk premium in the euro area is not low (see Chart C), indicating that equities are not particularly highly valued relative to bonds.** The estimated euro area equity risk premium increased significantly to levels between 6% and 8% in the wake of the 2008 financial crisis. At the same time, the equity risk premium, just like any risk premium embedded in financial market prices, is an unobservable object. Hence, any measurement (including the one presented here) is to some extent uncertain and estimated levels of such premia should be interpreted with caution.

## Chart C

### Dividend discount model euro area equity risk premium, overall index

(percentage points)



Sources: Thomson Reuters and ECB calculations  
Notes: Estimated via a dividend discount model applied to the overall index. The latest observation is for June 2017.