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Presidential cycles and time-varying bond–stock market correlations: Evidence from more than two centuries of data

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HIGHLIGHTS

- We document a presidential cycle effect on stock-bond market correlations.
- Democratic administrations are associated with lower degree of co-movement.
- The negative presidential cycle effect is robust over various sub-samples.

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ABSTRACT

Utilizing a DCC-GARCH model to capture time-varying correlations, we show that Democratic administrations are generally associated with lower degree of co-movement between the stock and government bond returns. The findings are in line with the documented presidential cycle effect on stock market returns and corroborate recent evidence that, when risk aversion is high, agents tend to elect the Democratic Party.

1. Introduction

Stock market returns in the U.S. are found to be significantly higher under Democratic presidents than under Republicans. However, the source of this return gap is unclear. Santa-Clara and Valkanov Rossen (2003) dub this phenomenon the "presidential puzzle", after ruling out various potential explanations, including risk-based arguments. Pástor and Veronesi (2017) recently develop a model of political cycles in which the presidential puzzle emerges endogenously. They show theoretically that when risk aversion is high, voters are more likely to elect a Democratic president because they demand more social insurance. However, when risk aversion is low, a Republican president is likely to be elected since the voters want to take on more business risk. Therefore, greater risk aversion under Democrats results in a higher equity risk premium, thus higher average return. An immediate implication of this theoretical observation is that, since agents have higher risk aversion when Democratic presidents are in power, it is likely that one would expect to see a re-allocation in investment portfolios out of equities towards less risky assets, such as government bonds. As a result, the correlation between returns of these two major asset classes is likely to be reduced in magnitude, and possibly, even turn negative due to fund flows in opposite directions. Clearly, this is an issue of high importance for portfolio diversification and risk management.

Against this backdrop, the objective of our study is to analyze the evolution of the correlations between U.S. stock and government bond returns using Engle's (2002) dynamic conditional correlation generalized autoregressive conditional heteroskedasticity (DCC-GARCH) model on monthly data over the historical period of 1791:09–2017:12. Besides accounting for time-varying volatility behavior of the data series, a major advantage of the DCC-GARCH approach is its ability to detect changes in the conditional

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correlation over time, both in terms of sign and magnitude. Unlike rolling windows (an alternative way to capture time-variation), the proposed measure of correlation does not suffer from the so-called "ghost features", as the effects of a shock are not reflected in n consecutive periods, with n being the window span (Antonakakis et al., 2013). Furthermore, under the DCC-GARCH, there is no need to set a window span, or incur loss of observations, besides not having to conduct subsample estimations. Once the time-varying correlations are obtained, we conduct regression analysis over the full sample of more than two centuries and various sub-samples based on structural break tests and examine the effect of the presidential cycles on the dynamic conditional correlations (DCC).

While there exists a large literature that has analyzed the co-movement of bond and stock returns [see, Kollias et al. (2013) and Selmi et al. (forthcoming) for detailed reviews] and various covariates (e.g. macroeconomic and financial variables, uncertainty and geopolitical risks) have been used to explain the underlying relationship between these two assets, to the best of our knowledge, this is the first paper to not only study the dynamic correlations between stock and bond returns over a period of more than two centuries, but also relate them to the presidential cycles in the U.S. Our findings empirically validate the presidential cycle effect on return correlations and support the suggestion that the presidential cycle effect on financial market returns emerges endogenously such that higher risk aversion during Democratic presidential cycles leads to fund flows into relatively safer assets out of risky counterparts. The remainder of the paper is organized as follows: Section 2 describes the empirical methodology, Section 3 presents the data and the empirical findings and Section 4 concludes the paper.

2. Methodology

In order to examine the evolution of co-movement between the government bond and equity returns, we obtain a time-varying measure of correlation based on the dynamic conditional correlation model of Engle (2002). Let $y_t = [y_{1t}, y_{2t}]'$ be a 2×1 vector comprising the data series. The conditional mean equations are represented by

$$A(L)y_t = +\varepsilon_t,\ \varepsilon_t|\Omega_{t-1} \sim N(0, H_t),\ \textit{and}\ t = 1, \ldots, T \qquad (1)$$

where A is a matrix of endogenous variables, L the lag operator and ε_t is the vector of innovations based on the information set, Ω, available at time $t-1$. The ε_t vector has the following conditional variance–covariance matrix

$$H_t = D_t R_t D_t, \qquad (2)$$

where $D_t = diag\sqrt{h_{it}}$ is a 2×2 matrix containing the time-varying standard deviations obtained from univariate GARCH(p, q) models as

$$h_{it} = \gamma_i + \sum_{p=1}^{P_i} \alpha_{ip}\varepsilon^2_{it-ip} + \sum_{q=1}^{Q_i} \beta_{iq}h_{iq-q}, \quad \forall i = 1, 2. \qquad (3)$$

The DCC(M,N) model of Engle (2002) comprises the following structure

$$R_t = Q_t^{*-1} Q_t Q_t^{*-1}, \qquad (4)$$

where

$$Q_t = (1 - \sum_{m=1}^{M} a_m - \sum_{n=1}^{N} b_n)\overline{Q} + \sum_{m=1}^{M} a_m(\varepsilon^2_{t-m}) + \sum_{n=1}^{N} b_n Q_{t-n}. \qquad (5)$$

$\overline{Q}$ is the time-invariant variance–covariance matrix retrieved from estimating Eq. (3), and Q_t^* is a 2×2 diagonal matrix comprising the square root of the diagonal elements of Q_t. Finally, $R_t = \rho_{ij_t} = \frac{q_{ij,t}}{\sqrt{q_{ii,t}q_{jj,t}}}$ where $i, j = 1, 2$ is the 2×2 matrix consisting of the conditional correlations between the government bond and stock returns, which is our main focus.

3. Data and results

The two main variables of interest in our empirical analysis are the monthly 10-year government bond and equity returns for the U.S. over the period of 1791:9–2017:12, including 2716 observations. The stock (SR) and bond (BR) returns are computed as the first-difference of the natural logarithms of the S&P500 and the 10-year government bond total return indices, respectively. The data on both indices are obtained from the Global Financial Database, with the start and end dates driven by data availability. Given that we use stock and bond returns, we satisfy the condition of stationarity required for the estimation of the DCC-GARCH approach.[1] Separately, we obtain data on the presidential cycles from http://www.enchantedlearning.com/history/us/pres/list.shtml. This information is used to create a dummy that captures presidential cycles, taking a value of one for months during which a Democratic president was in office and zero otherwise.[2]

Table 1 reports the results of the DCC model. Panels A and B present the conditional mean and variance results, respectively, while Panel C reports the Ljung–Box Q-Statistics on the standardized and squared standardized residuals up to 4 and 8 lags. The choice of the lag-length of the autoregressive process of the conditional mean, which is equal to six, is based on the Akaike information criterion (AIC).[3]

Examining the conditional mean results reported in Table 1, we observe that the past values of bond and stock returns in general have a significant effect on the current values of the same. The conditional variance results reported in the same table support the existence of the GARCH effects, as the coefficients α_1 and β_1 are highly significant. Moreover, the coefficients a and b are highly significant, indicating that the correlations are indeed time-varying, validating the choice of the DCC model to capture the time variation in co-movement. Finally, the model does not suffer from serial correlation in the squared (standardized) residuals, according to the misspecification tests reported in Panel C of Table 1.

Fig. 1 presents the DCCs of bond and stock returns estimated in Table 1, along with their 95% confidence intervals, superimposed on the months during which a Democratic president was in power, as indicated by the shaded areas. As seen in Fig. 1, it is evident that DCCs between bond and stock market returns in general are significantly positive over the entire sample period, barring the months of 1792:05–1793:02, 1929:12–1931:10, 1957:06–1962:06, 1966:05–1966:08, 1966:12–1967:01, 1967:03, 2001:10, and 2001:12–2017:12, where the relationship turns significantly negative. The strong degree of significance is highlighted by the very tight confidence bands, to the extent that it cannot be distinguished from the estimate of the DCC. More importantly, visual inspection suggests that the DCC estimates tend to decline during months when a Democratic president was in power, with the only exception being the Republican Bush administration during the 2001:01–2008:12 period. Interestingly, this period also coincides with the commodity boom during which the commodity market experienced significant fund flows from financial investors — a phenomenon termed as commodity financialization in the literature (Demirer et al., 2015).

[1] Complete details of various unit root tests indicating that both returns series are stationary are available upon request from the authors.

[2] It must be pointed out that there were presidential cycles over which both Democratic and Republican parties were in office together (for example, 1801–1829), for which the dummy variable took the value of one. Also, in years 1791–1801 and 1841–1845, 1849–1853, and 1865–1869, presidents came from Federalist, Whig and National Union parties respectively. For these years, the dummy variable is assigned the value zero.

[3] The Schwarz information criterion (SIC) suggested an optimal lag of one. However, our results were both quantitatively and qualitatively similar to those reported in the paper when we obtained the correlation from the DCC-GARCH model with one lag only. Complete details of these results are available upon request.