# Government Debt, Dividend Growth, and Stock Returns

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## Abstract

The paper documents that the increase in public debt can lead to higher dividend payout to shareholders. It suggests that public debt can be a strong cash flow predictor which can help us to better predict future stock returns. Specifically, the higher public debt-to-GDP ratio can predict both higher dividend growth and higher stock returns, and the predicted changes are in the same magnitudes. The finding is consistent with Lettau and Ludvigson's (2005) argument that there exists a common component among stock returns and dividend growth. We argue that the existence of a common component can resolve the US asset pricing puzzle as emphasized by Cochrane (2007, 2011) that the dividend-price ratio can only predict discount rates but not cash flows; the public debt can drive the co-movement among returns and dividend growth and capture this common component; future stocks returns can be better out-of-sample predicted after controlling for public debt. To rationalize the finding, we propose a production-based asset pricing model incorporating cash-retention friction on the corporate sector. The model can produce testable predictions that the increase in public debt moves both dividend payment and the cost of capital in the same direction, resulting in the capture of the common component.

## Motivation

Background Facts: There is weak cash flow predictability at the US aggregate market level (Cochrane 2008 & 2011), at the US cross-section level (Maio and Santa-Clara 2015), and at the international level (Rangvid, Schmeling, and Schrimpf 2014).

Q: Can public debt predict dividend growth (cash flows)? A: Yes.

The implication on return predictability: Forecasting dividend growth to better predict returns (Lacerda and Santa-Clara 2010); dividend growth and return predictability are two sides of the same coin (Koijen and Van Nieuwerburgh 2011); expected returns and expected dividend growth are highly correlated (Golez 2014); a predictable component among returns and dividend growth (Lettau and Ludvigson 2005).

## Common Component Argument

Lettau and Ludvigson (2005) propose the common component $\eta_{t+j}$.

$$\Delta d_{t+j} = x_{d,t+j} + \eta_{t+j}$$
$$r_{t+j} = x_{r,t+j} + \phi_1 \cdot \eta_{t+j}$$

Take a diff:

$$r_{t+j} - \Delta d_{t+j} = x_{r,t+j} - x_{d,t+j} + (\phi_1 - 1)\eta_{t+j}$$

The common component $\eta_{t+j}$ is offsetted if $\phi_1 = 1$.

## Estimation Results

Null Hypothesis: $\phi_1 = 1$ (Main Results)

$$ret_{t,t+H} = \phi_{0,H} + \phi_1 E_t[\Delta d_{t,t+H}] + \phi_{2,H}\widetilde{dp}_t + \epsilon^r_{t,t+H}$$
$$\Delta d_{t,t+H} = \gamma_{0,H} + \gamma_{1,H}\frac{D}{Y}_t + \epsilon^d_{t,t+H}$$
$$H = 1, \cdots, 5y$$

where

$ret_{t,t+H} :\equiv \frac{1}{H}\sum_{j=1}^{H} r_{t+j}$, $\Delta d_{t,t+H} :\equiv \frac{1}{H}\sum_{j=1}^{H}\Delta d_{t+j}$ and $\widetilde{dp}_t = dp_t - \overline{dp_t}$

GMM Estimation, Sample 1966Q1:2017Q4

$\phi_1 = 1.05$, s.e.=0.12 Test: $\phi_1 = 1$, p-value: 0.6396

## Model - Production Sector

$$\max_{\{I_t, N_t, K_t, D_t^C\}} E_0\left[\sum_{t=1}^{\infty} M_t Div_t\right]$$

Firm's Cash Flows:

$$\text{CF}_t \leq Y_t - W_t N_t - T_t - I_t + D_t^C - R_{d,t-1}D_{t-1}^C - C_t^E + R_{l,t-1}CH_{t-1}$$
$$\text{Div}_t = \beta_{d,t} CF_t, CH_t = (1-\beta_{d,t})CF_t$$
$$\beta_{d,t+1} = (1-\rho_\beta)\bar{\beta}_d + \rho_\beta \beta_{d,t} + \epsilon_{\beta_d,t+1}$$

Production+Capital Motion:

$$\text{Y}_t = (K_{t-1})^\alpha (\Omega_t N_t)^{1-\alpha}$$
$$\Omega_t = e^{a_t}, \Delta a_t = \mu + z_{t-1} + \epsilon_{a,t}, \epsilon_{a,t} \sim N(0, \sigma_a^2)$$
$$\text{z}_t = \rho z_{t-1} + \epsilon_{z,t}, \epsilon_{z,t} \sim N(0, \sigma_z^2)$$
$$\text{K}_t \leq (1-\delta)K_{t-1} + \Lambda\left(\frac{I_t}{K_{t-1}}\right)K_{t-1}$$

## Simulation-based Results

Common Component $\phi_{1,H}$ Estimation

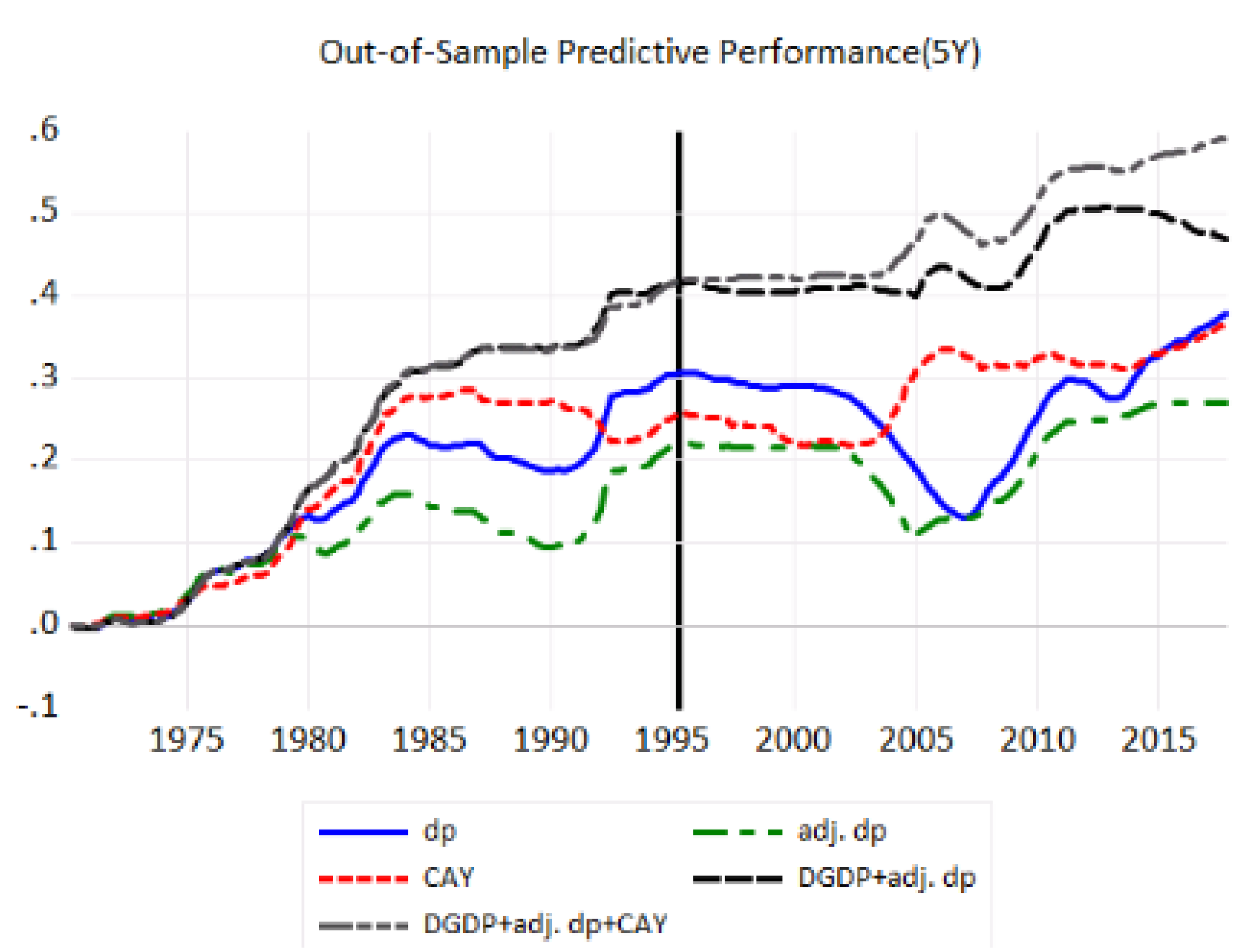
$$ret_{t,t+H} = \phi_{0,H} + \phi_{1,H}\left(\gamma_{1,H}\frac{D}{Y}_t\right) + \epsilon^r_{t,t+H}$$
$$\Delta d_{t,t+H} = \gamma_{0,H} + \gamma_{1,H}\frac{D}{Y}_t + \epsilon^d_{t,t+H}$$

| | Data | | Benchmark | | No Cash-Retention | |
|---|---|---|---|---|---|---|
| Coeff. | est. | s.e. | avg. | [$1^{st}$Quin,$4^{th}$Quin] | avg. | [$1^{st}$Quin,$4^{th}$Quin] |
| $\phi_{1,1}$ | **1.12** | (0.02) | 1.11 | [ -1.40, 2.93 ] | -0.54 | [ -0.51, -0.40 ] |
| $\phi_{1,3}$ | **0.97** | (0.02) | 0.92 | [ 0.35, 1.86 ] | -0.49 | [ -0.50, -0.36 ] |
| $\phi_{1,5}$ | **0.94** | (0.04) | 0.93 | [ 0.38, 1.43 ] | -0.49 | [ -0.53, -0.35 ] |

## Out-of-Sample Evidence

**Role of Expected Dividend Growth in Forecasting Returns**

Black v.s. Green, measured by the accumulated RMSE.




## Conclusion

When public debt increases, tax uncertainty and the cost of capital will increase. Firms would pay more cash to shareholders and the observed dividend payouts increase. Returns and dividend growth move in the same direction, and the co-movement parts have an off-setting effect on the dividend-to-price ratio.(**Public debt is the driving force!**) It resolves the puzzle (that the dividend-price ratio cannot predict the dividend growth), and help to forecast future returns.

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