Equity Duration and Predictability

Benjamin Golez and Peter Koudijs

Discussant: **Andrei S. Gonçalves**

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Outline

$\uparrow$ Dividend Maturity $\Rightarrow$ $\uparrow$ % of $Var(dp)$ Explained by μ

- 1-Year Dividend Strip:

$$P^{(1)} = D_1 \cdot e^{-\mu_1}$$
$$= D \cdot e^{g_1 - \mu_1}$$
$$\Downarrow$$
$$dp^{(1)} = \mu_1 - g_1$$

- 2-Year Dividend Strip:

$$P^{(2)} = D_2 \cdot e^{-(\mu_1 + \mu_2)}$$
$$= D \cdot e^{(g_1+g_2)-(\mu_1+\mu_2)}$$
$$\Downarrow$$
$$dp^{(2)} = (\mu_1 + \mu_2) - (g_1 + g_2)$$

↑ Dividend Maturity ⇒ ↑ % of $Var(dp)$ Explained by μ

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- 2-Year Dividend Strip:

$$P^{(2)} = D_2 \cdot e^{-(\mu_1 + \mu_2)} = D \cdot e^{(g_1 + g_2) - (\mu_1 + \mu_2)}$$

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dp^{(1)} &= \mu_1 - g_1
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- 2-Year Dividend Strip:

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dp^{(2)} &= (\mu_1 + \mu_2) - (g_1 + g_2)
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$\uparrow$ Equity Duration $\Rightarrow$ $\uparrow$ % of $Var(dp)$ Explained by μ

- AR(1) processes for μ and g (ignoring constants):

- Then, the dividend price ratio is (ignoring constants):

- And Gonçalves (2020a) shows that $Dur \approx 1 + e^{-\overline{dp}} = \frac{1}{1-\rho}$

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$$\mu_{t+1} = \delta_\mu \cdot \mu_t + \epsilon^{\mu}_{t+1}$$

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$$dp_t = \mathbb{E}_t\left[\sum_{j=1}^{\infty} \rho^{j-1} r_{t+j}\right] - \mathbb{E}_t\left[\sum_{j=1}^{\infty} \rho^{j-1} \Delta d_{t+j}\right]$$

$$= \left(\frac{1}{1-\rho\cdot\delta_\mu}\right)\cdot\mu_t + \left(\frac{1}{1-\rho\cdot\delta_g}\right)\cdot g_t$$

  - If $\rho = 0$, persistence does not matter
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Decomposing $Var(dp)$: Market vs Dividend Strips

$$r_{t+1} = \beta_r \cdot dp_t + \epsilon^r_{t+1}$$

$$\Delta d_{t+1} = \beta_d \cdot dp_t + \epsilon^d_{t+1} \quad \Rightarrow \quad \begin{cases} Var_r(dp) = \beta_r \,/\, (1 - \rho \cdot \beta_{dp}) \\ Var_d(dp) = \beta_d \,/\, (1 - \rho \cdot \beta_{dp}) \end{cases}$$

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ER (implied)	0.97	0.63
EDG	0.03	0.37
EDG (implied)	0.02	0.27

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	1629-1945	1945-2017
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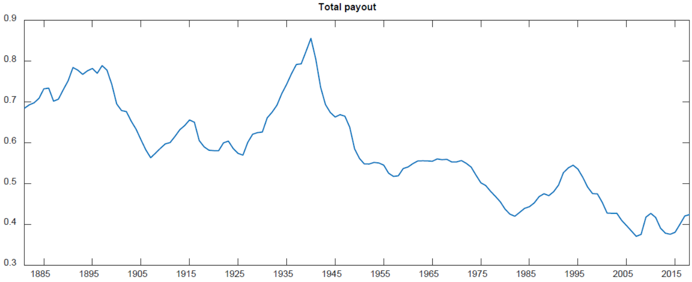

Decomposing *Var*(*dp*): Cross-Sectional Analysis

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	Below 0.5	Above 0.5
	(5)	(6)
ER	0.93	0.60
ER (implied)	0.88	0.55
EDG	0.12	0.45
EDG (implied)	0.07	0.40

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Outline

Is it Really about ρ?

$$dp_t = \left(\frac{1}{1-\rho\cdot\delta_\mu}\right)\cdot\mu_t + \left(\frac{1}{1-\rho\cdot\delta_g}\right)\cdot g_t$$

- I do not think so!

- Data: DP decreases from 3.4% ($\rho = 0.97$) to 4.9% ($\rho = 0.95$)

- Data: ER increases from 34% to 89%

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Table 7: Simulations

Payout (%)	30	40	50	60	70	80	90	100
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
DP (%)	2.81	3.75	4.70	5.67	6.65	7.64	8.65	9.70
ρ	0.97	0.96	0.96	0.95	0.94	0.93	0.92	0.91
ER	0.94	0.91	0.87	0.84	0.80	0.77	0.74	0.72
EDG	0.05	0.09	0.12	0.15	0.18	0.21	0.23	0.25

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$$= \left(\frac{1}{1-\rho\cdot\beta_{dp}}\right)\cdot(\beta_r\cdot dp_t) + \left(\frac{1}{1-\rho\cdot\beta_{dp}}\right)\cdot(\beta_d\cdot dp_t)$$

- In the empirical analysis, ρ has no effect because the persistences are the same ($=\beta_{dp}$)
- The effect comes from:
- In fact, since $Cor(\mu, dp) = Cor(g, dp)$, the effect comes from:

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$$\sigma_\mu = \beta_r\cdot\sigma_{dp} \quad vs \quad \sigma_g = \beta_d\cdot\sigma_{dp}$$

Does that mean the Paper's Message is Wrong?

- **No!** It may still be about duration (and I think it largely is)
- Gormsen (2020) shows that $\sigma(\mu_{DivStrip}) < \sigma(\mu_{Equity})$
- Gonçalves (2020b) shows how to think about $\sigma(\mu_{DivStrip}) < \sigma(\mu_{Equity})$ from an ICAPM perspective:

$$- \ \gamma_t \cdot \widetilde{r}_{w,t+1} \ - \ (\gamma_t - 1) \cdot \widetilde{vw}_{t+1}$$

$$- \ \gamma_t \cdot \widetilde{r}_{w,t+1} \ - \ \lambda^{'} \widetilde{s}_{t+1}$$

- Duration endogenously determines market β
- $\uparrow$ Dur $\Rightarrow \uparrow \beta_w \Rightarrow \uparrow \sigma_\mu \Rightarrow \uparrow$ More of σ_{dp} is driven by μ
- Section 2 (i.e., the motivation) should argue that the duration effect can happen through σ_μ (not only through ρ)

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	Market	Dividend strips
	(1)	(2)
ER	0.98	0.73
ER (implied)	0.97	0.63
EDG	0.03	0.37
EDG (implied)	0.02	0.27

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Do ρ, δ_μ, and δ_g Also Play a Role?

- The empirical analysis uses $\delta_\mu = \delta_g = \beta_{dp}$ and $Cor(\mu, g) = 1$
- As such, $\sigma_\mu^{LT} = \frac{1}{1-\rho\cdot\beta_{dp}} \cdot \sigma_\mu$ and $\sigma_g^{LT} = \frac{1}{1-\rho\cdot\beta_{dp}} \cdot \sigma_g$
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Parameters	$t \leq 1945$	$t > 1945$				
		All	ρ	σ	δ	σ & δ
$\sigma_\mu^{LT}/\sigma_g^{LT}$	0.72					
ER	29.2%					
EDG	70.8%					

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Parameters	$t \leq 1945$	$t > 1945$				
		All	ρ	σ	δ	σ & δ
$\sigma_\mu^{LT}/\sigma_g^{LT}$	0.72	6.38				
ER	29.2%	98.1%				
EDG	70.8%	1.9%				

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Parameters	$t \leq 1945$	$t > 1945$				
		All	ρ	σ	δ	σ & δ
$\sigma_\mu^{LT}/\sigma_g^{LT}$	0.72	6.38	0.79			
ER	29.2%	98.1%	34.4%			
EDG	70.8%	1.9%	65.6%			

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Parameters	$t \leq 1945$	$t > 1945$				
		All	ρ	σ	δ	σ & δ
$\sigma_\mu^{LT}/\sigma_g^{LT}$	0.72	6.38	0.79	4.26		
ER	29.2%	98.1%	34.4%	99.6%		
EDG	70.8%	1.9%	65.6%	0.4%		

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Parameters	$t \leq 1945$	$t > 1945$				
		All	ρ	σ	δ	σ & δ
$\sigma_\mu^{LT}/\sigma_g^{LT}$	0.72	6.38	0.79	4.26	0.96	
ER	29.2%	98.1%	34.4%	99.6%	47.0%	
EDG	70.8%	1.9%	65.6%	0.4%	53.0%	

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Parameters	$t \leq 1945$	$t > 1945$				
		All	ρ	σ	δ	σ & δ
$\sigma_\mu^{LT}/\sigma_g^{LT}$	0.72	6.38	0.79	4.26	0.96	5.64
ER	29.2%	98.1%	34.4%	99.6%	47.0%	100.7%
EDG	70.8%	1.9%	65.6%	0.4%	53.0%	-0.7%

Outline

The Paper in a Nutshell

My Comments

Final Remarks

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- The paper is very interesting and makes an important point:

  Duration matters to understand the sources of price variation!

- I recommend reading the paper and I expect it to publish well

- It would be useful to:

- Good luck!

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  - Recognize that the results are about σ_μ/σ_g and not ρ
  - Start from a completely different motivation for why duration matters when decomposing returns (because it affects σ_μ/σ_g!)
  - Link the results to some economic framework that demonstrates the connection between duration and σ_μ/σ_g

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