Duration-Driven Returns

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AFA 2020

Outline

Part 1: High CAPM α = Low CF Growth

- High BE/ME
- High Profitability
- Low Investment
- Low Risk
- High Payout

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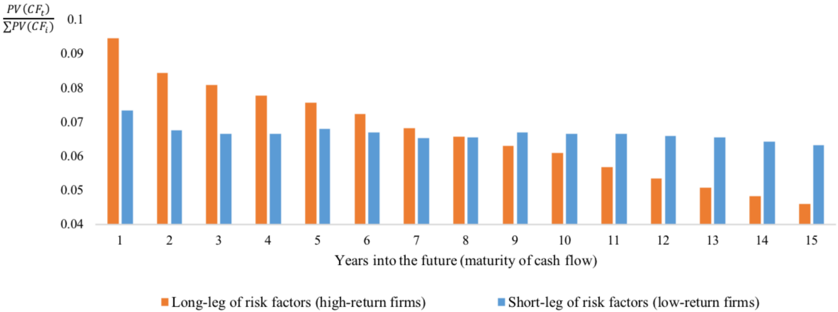
Fig 1.a: Relative Size of the First Fifteen Cash-Flows for the Firms the Risk Factors Invest in



Part 2: A Factor Model with Duration

$$\text{LTG}_{i,t} = \underbrace{\beta_{OP} \cdot OP_{i,t} + \beta_{INV} \cdot INV_{i,t} + \beta_{BETA} \cdot BETA_{i,t} + \beta_{PAY} \cdot PAY_{i,t}}_{DUR_{i,t}} + \epsilon_{i,t}$$

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Table 4
Summarizing the Major Risk Factors with the Duration Factor

Factor	CAPM model		
	α_{CAPM}	β_{CAPM}	R^2
HML	**0.32** (2.82)	**-0.14** (-5.61)	0.04
RMW	**0.28** (3.69)	**-0.11** (-6.17)	0.05
CMA	**0.30** (4.57)	**-0.15** (-9.73)	0.12
BETA	**0.56** (4.36)	**-0.81** (-28.39)	0.56
PAYOUT	**0.24** (3.51)	**-0.32** (-20.69)	0.39

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Factor	CAPM model			Three-factor model				
	α_{CAPM}	β_{CAPM}	R^2	α_{Two}	β_{Mkt}	β_{Smb}	β_{Dur}	R^2
HML	**0.32** (2.82)	**-0.14** (-5.61)	0.04	-0.14 (-1.49)	**0.15** (5.31)	**0.36** (10.12)	**-0.68** (-16.83)	0.35
RMW	**0.28** (3.69)	**-0.11** (-6.17)	0.05	0.09 (1.40)	**0.09** (4.99)	**-0.12** (-4.87)	**-0.41** (-15.27)	0.36
CMA	**0.30** (4.57)	**-0.15** (-9.73)	0.12	0.07 (1.15)	0.00 (-0.10)	**0.19** (8.73)	**-0.33** (-13.49)	0.33
BETA	**0.56** (4.36)	**-0.81** (-28.39)	0.56	0.08 (0.86)	**-0.37** (-14.06)	**-0.09** (-2.53)	**-0.91** (-24.32)	0.79
PAYOUT	**0.24** (3.51)	**-0.32** (-20.69)	0.39	-0.04 (-0.86)	**-0.07** (-5.07)	-0.03 (-1.83)	**-0.53** (-27.50)	0.73

Part 3: Cash Flow Duration Drives the Results

$$\mathbb{E}_t[r_{i,t+1}] = \sum_{h=1}^{\infty} w_{i,t}^{(h)} \cdot \mathbb{E}_t[r_{i,t+1}^{(h)}]$$

- Maybe $\mathbb{E}_t[r_{i,t+1}^{(h)}]$ differs across firms and correlates with $w_{i,t}^{(h)}$

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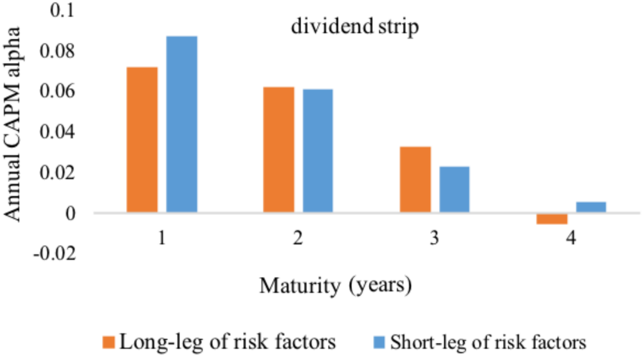

Part 4: Consistency with Lettau and Wachter (2007)

$$\Delta d_{t+1} \; = \; \mu_g + z_t + \sigma_d \cdot \epsilon_{d,t+1}$$

$$m_{t+1} - \mathbb{E}_t \left[m_{t+1} \right] \; = \; - x_t \cdot \epsilon_{d,t+1}$$

- z_t and x_t are AR(1) with $\rho_{zx} = 0$, $\rho_{dx} = 0$, and $\rho_{dz} < 0$

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	SMB	HML	RMW	CMA	Low Risk	DUR
Long-leg:	Small firms	High B/M	High profit	Low investment	Low beta	High duration
Short-leg:	Big firms	Low B/M	Low profit	High investment	High beta	Low duration
CAPM alpha	-0.37	0.24	0.64	0.49	0.43	-0.66
Duration (years)	3.3	-3.3	-14.2	-7.5	-5.6	14.7

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- Important result that has not been explored that extensively by recent equity duration papers such as Weber (2018), Gonçalves (2018), and Chen and Li (2018)
- But Chen (2017, JF) has different results for Value vs Growth
- "Chen (2017) shows that the growth rates of value firms is higher than that of growth firms in the late US sample"
- We need to understand why the results differ...

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- Your factor model is:
- Can you show that αs are not zero with factor models that replace $\beta^{i}_{dur} \cdot r^{dur}_{t+1}$ with:

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- Your factor model is:

$$r_t^i = \alpha_{dur}^i + \beta_{Mkt}^i \cdot \left(r_{t+1} - r_f^f\right) + \beta_{smb}^i \cdot r_{t+1}^{smb} + \beta_{dur}^i \cdot r_{t+1}^{dur} + u_{i,t}$$

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- Can you show that αs are not zero with factor models that replace $\beta_{dur}^i \cdot r_{t+1}^{dur}$ with:
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  - $\beta_{op}^i \cdot r_{t+1}^{op}$
  - $\beta_{inv}^i \cdot r_{t+1}^{inv}$
  - $\beta_{beta}^i \cdot r_{t+1}^{beta}$
  - $\beta_{pay}^i \cdot r_{t+1}^{pay}$

3) Rule out Market Segmentation

$$\mathbb{E}_t[r_{i,t+1}] = \sum_{h=1}^{\infty} w_{i,t}^{(h)} \cdot \mathbb{E}_t[r_{i,t+1}^{(h)}]$$

- You showed $\mathbb{E}_t[r_{i,t+1}^{(h)}]$ **does not** vary with firm characteristics
- To rule out market segmentation stories, show that

  does vary with firm characteristics ($\widetilde{w}_{i,t}^{(h)} = P_{i,t}^{(h)} / \sum_{h=1}^{h=4} P_{i,t}^{(h)}$)
- Alternatively, show that strip-based duration varies with firm characteristics:

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$$\overline{Dur}_{i,t} = \sum_{h=1}^{4} \widetilde{w}_{i,t}^{(h)} \cdot h$$

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- "Near-future cash flows are likely more exposed to cash-flow risk and distant-future cash flows are likely more exposed to discount rate risk, and these two types of risk may carry different risk premia as in Campbell and Vuolteenaho (2004)"
- I agree: Gonçalves (2018a) and Gonçalves (2018b)
- But your book-equity definition implies (ignoring constants):

$$\text{Value} \;=\; be_{i,t} - me_{i,t} \;=\; \sum_{h=1}^{\infty} \rho^h \cdot \mathbb{E}_t[r_{i,t+j}]$$

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Other (more methodological) Comments

1. Report a $LTG_{j,t}$ prediction model without firm fixed effects (how high is this cross-sectional R^2?)
2. Report results from regression in Equation 4 (including R^2)
3. Report results for a duration factor based on $LTG_{j,t}$ for firms that have it ($LTG_{j,t}$ is truly available at time t and includes ϵ)
4. In Table 7, some characteristics are statistically significant after controlling for dividend maturity. You need to explain the units and elaborate on the (lack of) economic significance
5. In section 6, use $y_t^{(10years)} - y_t^{(3months)}$ as it is standard
6. You need to better detail the model calibration. Is it the same used in Lettau and Wachter (2007)?

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  - Rule out market segmentation in the dividend strip tests
  - Consider an alternative model framework (or focus on empirics)
- Good luck!