Duration-Driven Returns

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Motivation: Understanding Equity Risk Factors

Part 1: Commonality:

a Value, profit, investment, low-risk, and payout factors buy low-growth firms

b Can be summarized by a low-growth (short-duration) factor

Part 2: Mechanism:

c New dataset of single-stock dividend futures to test competing theories

d Duration-driven returns: CAPM alphas arise as a product of short cash-flow duration

Growth Rates

Measuring Expected Growth Rates

1. **Realized growth rates**

2. **Long term cash flow growth forecast (LTG) from IBES database**

Measuring Expected Growth Rates

1. **Realized growth rates**
2. **Long term cash flow growth forecast (LTG) from IBES database**
   - Ex ante analyst expectations of growth rate over next business cycle
   - Available from 1981

   We run firm-level panel regressions:

   $$\text{LTG}_{i,t} = X'_{i,t}\Gamma + e_{i,t}$$

   where

   - $\text{LTG}_{i,t}$ is the median LTG for firm i at time t
   - $X'_{i,t}$ is a vector of firm i characteristics at time t
   - LTG and firm characteristics are measured as cross-sectional percentiles

Expected Growth Rates and Characteristics

Results of the following panel regression:

$$\mathrm{LTG}_{i,t} = X_{i,t}'\Gamma + e_{i,t} \tag{1}$$

	Dependent variable: (LTG)
High BM	
High profit	
Low investment	
Low beta	
High payout	
Fixed effect	
Cluster	
Weight	
Sample	
Observations	
R-squared	

Expected Growth Rates and Characteristics

Results of the following panel regression:

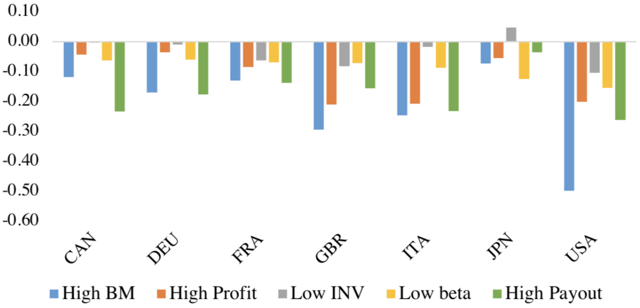
$$\text{LTG}_{i,t} = X_{i,t}'\Gamma + e_{i,t} \tag{2}$$

	Dependent variable: (LTG)		
High BM	**-0.493**	**-0.544**	**-0.282**
	(-52.86)	(-22.31)	(-35.42)
High profit	**-0.191**	**-0.240**	**-0.076**
	(-21.62)	(-10.25)	(-10.68)
Low investment	**-0.093**	**-0.090**	**-0.042**
	(-16.07)	(-4.71)	(-12.23)
Low beta	**-0.174**	**-0.277**	**-0.052**
	(-18.22)	(-12.40)	(-7.66)
High payout	**-0.262**	**-0.203**	**-0.102**
	(-33.21)	(-7.85)	(-15.74)
Fixed effect	Firm/Date	Firm/Date	Firm/Date
Cluster	Firm/Date	Firm/Date	Firm/Date
Weight	Analysts	Market Cap	None
Sample	Full	Full	Full
Observations	539,297	539,297	539,225
R-squared	0.48	0.44	0.68

Growth Rates and Characteristics

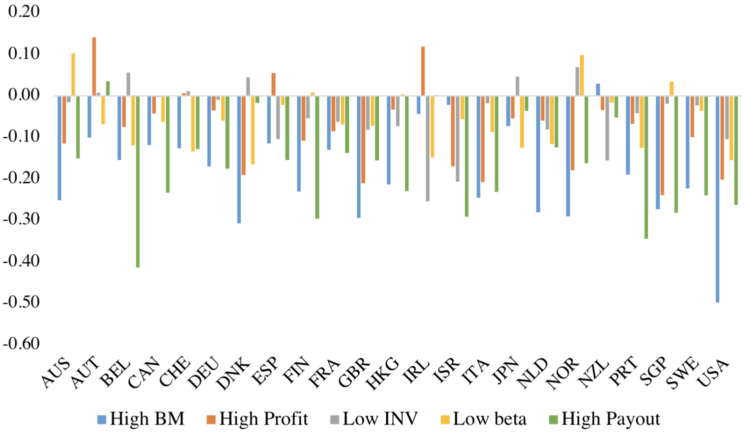
G7-countries

Panel B: G7 countries



Growth Rates and Characteristics

Countries in MSCI World Developed Index



Equity Factors & Growth: Intuition

Equity risk factors are intuitively related to cash flow growth and duration:

- **Value**: Opposite of growth
- **Low investment**: Low investment in generating future cash flows
- **High payout**: Low/few growth opportunities
- **High profit**: High profit firms are in the profitable part of their life cycle
- **Low beta/low volatility**: Firms with a short cash-flow duration are less sensitive to discount rate shocks and growth rate shocks, meaning they have lower betas and volatility

A Single Factor

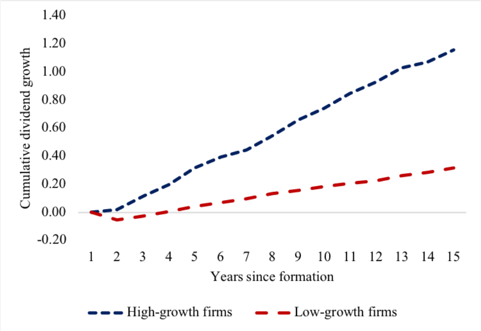
A New Growth/Duration Factor

Sorting on expected growth rates:

- The LTG variable from IBES only available for subset of firms
- Instead construct predicted LTG

$$\widehat{LTG}_{i,t} = \widehat{\gamma}_{OP}\mathrm{OP}_{i,t} + \widehat{\gamma}_{INV}\mathrm{INV}_{i,t} + \widehat{\gamma}_{BETA}\mathrm{BETA}_{i,t} + \widehat{\gamma}_{PAY}\mathrm{PAY}_{i,t}$$

- Create Fama-French (1993)-type factor



Risk Factors and the Duration Factor

New three-factor model:

$$r^i_{t+1} = \alpha_t + \beta^{MKT}(r^{MKT}_{t+1} - r^f_t) + \beta^{SMB} r^{SMB}_{t+1} + \beta^{DUR} r^{DUR}_{t+1} + \varepsilon_{t+1}$$

Factor	CAPM model			Three-factor model						
	α_{CAPM}	β_{CAPM}	R^2	α_{Three}	β_{Mkt}	β_{Smb}	β_{Dur}	R^2	*LTG*	*# obs*
HML	**0.32** (2.82)	**-0.14** (-5.61)	0.29						-9.8%	666
RMW	**0.28** (3.69)	**-0.11** (-6.17)	0.39						-5.0%	666
CMA	**0.30** (4.57)	**-0.15** (-9.73)	0.44						-6.7%	666
BETA	**0.56** (4.36)	**-0.81** (-28.39)	0.12						-8.0%	631
PAYOUT	**0.24** (3.51)	**-0.32** (-20.69)	0.13						-7.0%	666

Risk Factors and the Duration Factor

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HML	**0.32**	**-0.14**	0.29	-0.08	**0.14**	**0.36**	**0.63**	0.26	-9.8%	666
	(2.82)	(-5.61)		(-0.73)	(4.27)	(9.42)	(13.42)			
RMW	**0.28**	**-0.11**	0.39	0.10	**0.11**	**-0.10**	**0.42**	0.35	-5.0%	666
	(3.69)	(-6.17)		(1.59)	(5.54)	(-3.95)	(13.94)			
CMA	**0.30**	**-0.15**	0.44	0.07	0.01	**0.21**	**0.36**	0.32	-6.7%	666
	(4.57)	(-9.73)		(1.23)	(0.69)	(9.61)	(13.09)			
BETA	**0.56**	**-0.81**	0.12	0.03	**-0.26**	0.01	**1.08**	0.83	-8.0%	631
	(4.36)	(-28.39)		(0.30)	(-10.33)	(0.43)	(28.97)			
PAYOUT	**0.24**	**-0.32**	0.13	-0.07	-0.01	0.02	**0.62**	0.78	-7.0%	666
	(3.51)	(-20.69)		(-1.54)	(-0.87)	(1.34)	(32.12)			

Risk Factors and the Duration Factor

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RMW	**0.28** (3.69)	**-0.11** (-6.17)	0.39	0.10 (1.59)	**0.11** (5.54)	**-0.10** (-3.95)	**0.42** (13.94)	0.35	-5.0%	666
CMA	**0.30** (4.57)	**-0.15** (-9.73)	0.44	0.07 (1.23)	0.01 (0.69)	**0.21** (9.61)	**0.36** (13.09)	0.32	-6.7%	666
BETA	**0.56** (4.36)	**-0.81** (-28.39)	0.12	0.03 (0.30)	**-0.26** (-10.33)	0.01 (0.43)	**1.08** (28.97)	0.83	-8.0%	631
PAYOUT	**0.24** (3.51)	**-0.32** (-20.69)	0.13	-0.07 (-1.54)	-0.01 (-0.87)	0.02 (1.34)	**0.62** (32.12)	0.78	-7.0%	666

In the paper:

- Passing the "new factor test" of Feng, Giglio, and Xiu (2020)
- Explains long-run returns using Chernov, Lochstoer, and Lundeby (2020)

Mechanisms

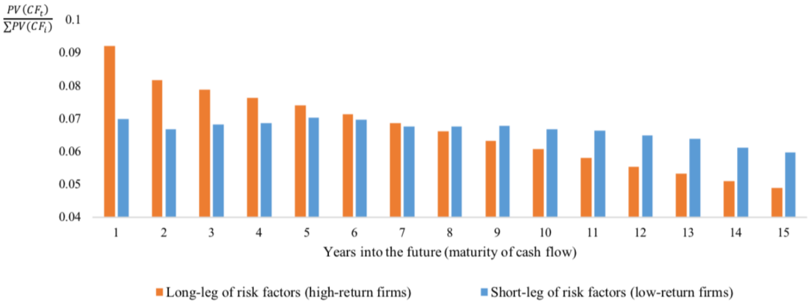
Cash-Flow Duration

Duration is the PV-weighted time to maturity of expected cash flows:

$$\text{Duration} = \sum_{i=1}^{\infty} i \times w_i, \text{ where } w_i = \frac{PV(CF_i)}{\sum PV(CF_i)}$$

Low-growth firms have relatively large near-future cash-flows = short duration

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



Hypothesis: Duration-Driven Returns

Under law of one price,

$$\alpha_t^i = \sum_{m=1}^{\infty} w_t^{i,m} \alpha_t^{i,m}$$

where α_t^m is one-period alpha on the $t+m$ cash flow and w_t^m is the relative present value of the cash flow.

Duration-Driven Returns:

- $\alpha_t^{i,m}$ is the same across firms i
- but $\alpha_t^{i,m}$ decreases in m

$\Rightarrow$ Firms with higher weight on near-future cash-flows have higher returns.

Alternative hypothesis:

- $\alpha_t^{i,m}$ varies across firms i
- Cash-flows on short-duration firm have higher alpha irrespective of maturity

NB: Goal is to explain CAPM alpha

- DUR has high CAPM alpha
- But average returns are only marginally significant

Single-Stock Dividend Futures

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- Single-stock dividend futures are claims to a given year's dividend on a firm
- Exchange traded products that allow you to buy a single year's dividend
- Similar to index dividend futures but on individual firms

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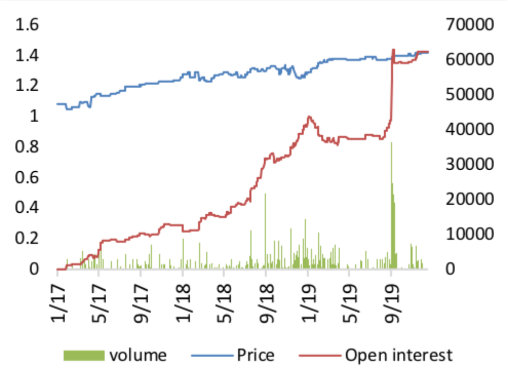
- Exchange traded on Eurex
  - Most trade is OTC but brought onto the book through Eurex OTC Trade Facilities
- We have data from Eurex (but also available on Bloomberg)
- Maturity: 1 to 4 years
- Period: 2010 - 2019
- Notional in our data: around USD 4 billion

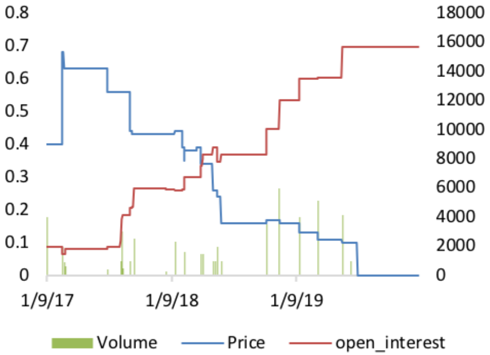
Example: Dividend Futures Price for AXA 2020 Dividend

Price (left y-axis), volume, and open interest (right y-axis) for the AXA 2020 dividend (one of the more liquid)



Example: Dividend Futures Price for DB 2020 Dividend

Price (left y-axis), volume, and open interest (right y-axis) for the Deutsche Bank 2020 dividend (one of the least liquid)

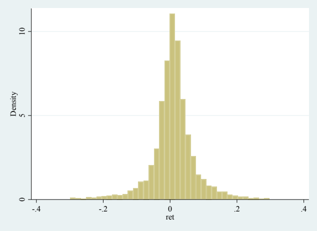


Single-Stock Dividend Futures

Summary stats:

- Average returns = 5% p.a.
- CAPM beta = 0.5
- Largely representative, except for size

Histogram: realized monthly returns (excluding months with zero return)



Testing the Mechanisms using Dividend Strips

Recall,

$$\alpha_t^i = \sum_{m=1}^{\infty} w_t^{i,m} \alpha_t^{i,m}$$

Dividend futures allow us to separate between the effect of duration and other firm-level effects

The following slides show results of panel regressions

- We look at
  - Expected returns (yields): $\left(E_t[D_{t+m}]/F_t^m\right)^{1/m}$
  - Realized returns: F_{t+1}^m / F_t^m
  - Expected CAPM alphas (assuming MRP of 5%)
  - Realized CAPM alphas

- We get expected dividends from IBES
- We estimate CAPM betas on the indidual strip level in separate regressions.

A Simple Sorting Exercise

CAPM ALPHA FOR PORTFOLIOS OF DIVIDEND STRIPS

	Maturity of Strip				
	1 year	2 year	3 year	4 year	Average
Short-duration firms					
Long-duration firms					
Average across firms					

A Simple Sorting Exercise

CAPM ALPHA FOR PORTFOLIOS OF DIVIDEND STRIPS

	Maturity of Strip				
	1 year	2 year	3 year	4 year	Average
Short-duration firms	0.082	0.070	0.056	0.035	0.061
Long-duration firms	0.088	0.077	0.066	0.044	0.069
Average across firms	0.085	0.074	0.061	0.040	

- The alphas decrease in maturity
- But are the same across firms

$\Rightarrow$ Duration-driven returns

Expected Returns and Alphas on Dividend Strips

Dependent variable	Expected ret	Expected ret	Expected ret	CAPM alpha	CAPM alpha	CAPM beta
2-year dummy		0.00	-0.00	-0.01*	-0.01*	0.42***
		(0.01)	(0.01)	(0.01)	(0.01)	(0.12)
3-year dummy		-0.00	-0.01*	-0.03***	-0.02**	0.81***
		(0.00)	(0.00)	(0.01)	(0.01)	(0.11)
4-year dummy		-0.02***	-0.02***	-0.04***	-0.04***	0.81***
		(0.00)	(0.00)	(0.01)	(0.01)	(0.13)
CAPM beta of strip ($\beta^{i,m}$)	0.01***		0.01***			
	(0.00)		(0.00)			
CAPM beta of firm (β^{i})	0.05**		0.05**			0.59**
	(0.02)		(0.02)			(0.19)
Cash-flow duration of firm	0.00		0.00	0.00	0.00	
	(0.00)		(0.00)	(0.00)	(0.00)	
Observations	1,245	1,255	1,245	1,255	1,255	1,736
R-squared	0.13	0.10	0.14	0.10	0.17	0.20
Fixed effect	Date/Cur	Date/Cur	Date/Cur	Date/Cur	Date/Cur	Date/Cur
Cluster	Date/Firm	Date/Firm	Date/Firm	Date/Firm	Date/Firm	Date/Firm
Weight	None	None	None	None	Notional	None

Takeaways

- Negative effect of maturity on expected alphas
- No effect of firm-level characteristics

Realized vs. Expected Returns on Dividend Strips

Dependent variable	Realized return	Realized returns	Realized log-return	Realized log-return	Realized return	Realized log-return
Expected return	0.67***	0.75***			0.43	
	(0.17)	(0.17)			(0.29)	
Expected log-return			0.70***	0.80***		0.43
			(0.14)	(0.14)		(0.26)
Observations	1,075	1,075	1,070	1,070	1,075	1,070
R-squared	0.203	0.250	0.171	0.217	0.147	0.158
Fixed effect	Firm	Date/Firm	Firm	Date/Firm	Firm	Date/Firm
Cluster	Date/Firm	Date/Firm	Date/Firm	Date/Firm	Date/Firm	Date/Firm
Weight	None	None	None	None	Notional	Notional

Takeaways

- Slope coefficients fairly close to 1 with firm-fixed effects

Realized Returns and Alphas on Dividend Strips

Dependent variable	Realized returns	Realized log-returns	Realized alpha	Realized alpha	Realized log-alpha	Realized log-alpha
2-year dummy	0.0039	-0.00081	-0.033	-0.032	-0.037	-0.041
	(0.019)	(0.016)	(0.025)	(0.025)	(0.023)	(0.025)
3-year dummy	0.013	0.0018	-0.060	-0.062	-0.070*	-0.070
	(0.031)	(0.028)	(0.040)	(0.044)	(0.038)	(0.043)
4-year dummy	-0.018	-0.035	-0.084*	-0.078	-0.10**	-0.092
	(0.035)	(0.033)	(0.042)	(0.068)	(0.043)	(0.068)
Observations	1,500	1,489	1,500	1,500	1,489	1,489
R-squared	0.205	0.164	0.244	0.218	0.213	0.197
Fixed effect	Date/Firm	Date/Firm	Date/Firm	Date/Firm	Date/Firm	Date/Firm
Cluster	Date/Firm	Date/Firm	Date/Firm	Date/Strip	Date/Firm	Date/Strip
Weight	None	None	None	Notional	None	Notional

Takeaways

- Same coefficients as with expected returns and alphas
- Lower t-statistics when looking at realizations

Realized Returns and Alphas on Dividend Strips

Dependent variable	Realized returns	Realized log-returns	Realized alpha	Realized alpha	Realized log-alpha	Realized log-alpha
2-year dummy	0.0043	-0.0028	-0.030	-0.036	-0.042	-0.042
	(0.020)	(0.015)	(0.025)	(0.021)	(0.024)	(0.023)
3-year dummy	0.0076	-0.0048	-0.063	-0.075*	-0.068	-0.068
	(0.033)	(0.028)	(0.041)	(0.035)	(0.037)	(0.038)
4-year dummy	-0.017	-0.036	-0.083	-0.10*	-0.092	-0.092
	(0.035)	(0.034)	(0.046)	(0.046)	(0.069)	(0.069)
Cash-flow duration of firm	-0.00073	-0.0012	-0.0017	-0.0021	-0.0034*	-0.0034*
	(0.0016)	(0.0014)	(0.0015)	(0.0013)	(0.0018)	(0.0017)
Observations	1,507	1,496	1,507	1,496	1,496	1,496
R-squared	0.046	0.039	0.061	0.064	0.082	0.082
Fixed effect	Date/currency	Date/currency	Date/currency	Date/currency	Date/currency	Date/currency
Cluster	Date/Firm	Date/Firm	Date/Firm	Date/Firm	Date/Firm	Date/Strip
Weight	None	None	None	Notional	None	Notional

Takeaways

- Firm-level cash-flow duration is marginally related to alphas and returns
- Consistent with overoptimistic expectations for long-duration firms

Expectations errors

Dependent variable	Realized returns – Expected returns		Realized log-returns – Expected log-returns	
2-year maturity dummy	0.0062	0.0062	-0.0019	-0.0010
	(0.016)	(0.016)	(0.013)	(0.012)
3-year maturity dummy	0.014	0.014	-0.0053	-0.0047
	(0.031)	(0.031)	(0.029)	(0.029)
4-year maturity dummy	-0.0028	-0.0028	-0.024	-0.024
	(0.031)	(0.031)	(0.034)	(0.034)
Cash-flow duration of firm	-0.0021	-0.0021	-0.0019*	-0.0021*
	(0.0013)	(0.0013)	(0.00098)	(0.0011)
Observations	1,081	1,081	1,076	1,076
R-squared	0.076	0.076	0.067	0.071
Fixed effect	Date/currency	Date/currency	Date/currency	Date/currency
Cluster	Date/Firm	Date/Firm	Date/Firm	Date/Firm
Weight	None	Notional	None	Notional

Takeaways

- No maturity-related errors
- Overoptimistic expectations for long-duration firms

Conclusions on Dividend Strips

Our results are *consistent* with “uration-Driven Returns”

- Expected and realized alpha decrease in maturity for individual firms

Our results are *inconsistent* with theories in which duration proxies for other firm-level difference

- Expected CAPM alpha does not vary across firms sorted by duration

Our results cannot rule out a role for behavioral overreaction in realized returns

- Realized CAPM alpha low for long-duration (high-growth) firms
- Signs of expectation errors, but only as they relate to cash-flow duration

Limitation:

- We only study the first 4 years of cash flows $\sim$ 10% of firm value
- However, we do offer robustness analysis in corporate bonds

Contributions and Conclusions

1. Commonality: Low growth rates
   - Major risk factor invest in low-growth firms
   - Can be summarized by a single factor
   - Shrinks the cross-section based on a tangible characteristic
2. Mechanism: Duration-Driven Returns
   - Isolate and test the role of duration in stock returns
   - Provides identification for the hypothesis by Lettau and Wachter (2007)
   - Still need explanation of the premium on near-future
3. New dataset:
   - Most models of the cross-section make predictions about individual cash flows on individual firms
     ⇒ New data to test these theories!
4. The pricing of individual cash flows on individual firms:
   - Hansen, Heaton, and Li (2008) use a model to infer strip prices
     - See Giglio, Kelly, and Kozak (2020) for more recent implications
   - We offer a model-free approach
     - Can potentially be used to discipline model-based approach

Appendix

References

Binsbergen, Jules H van, and Ralph SJ Koijen, 2017, The term structure of returns: Facts and theory, *Journal of Financial Economics* 124, 1–21.

Univariate Correlation

Panel B: Univariate Correlation Between LTG and Characteristics

Panel B: Firm-level univariate correlations between characteristics and survey expectations of growth rates

	High BM	High profit	Low inv	Low beta	Low IV	High pay
Survey growth rates	-0.40	-0.12	-0.26	-0.30	-0.37	-0.37

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Figure 4: Cumulative Alpha for the Duration Factor

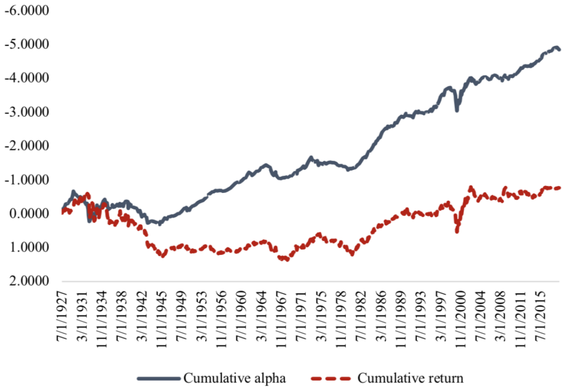

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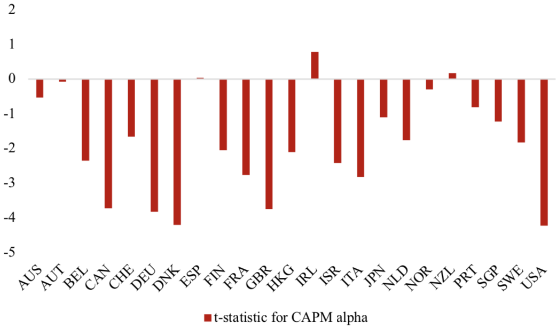
Figure 5: The Duration Factor Around The World

$$r_{t+1}^{k} = \alpha + \beta^{MKT}(r_{t+1}^{MKT,k} - r_t^f) + \varepsilon_{t+1}$$



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Single Stock Dividend Futures

Some facts about dividend futures:

- Dividend futures arise from hedging demand for financial institutions
- Most trade takes place off the order book
- Daily volume 2018: 20,000 contracts (each contract is on 1,000 shares)

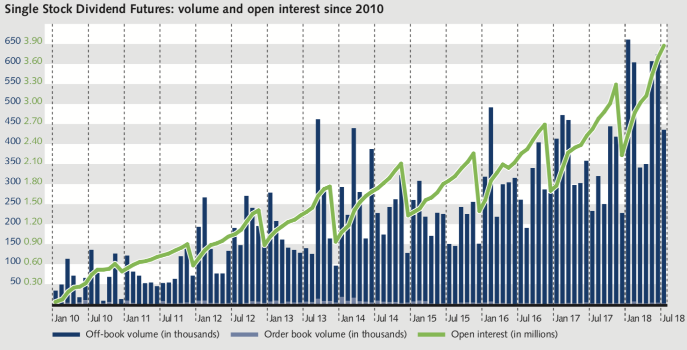

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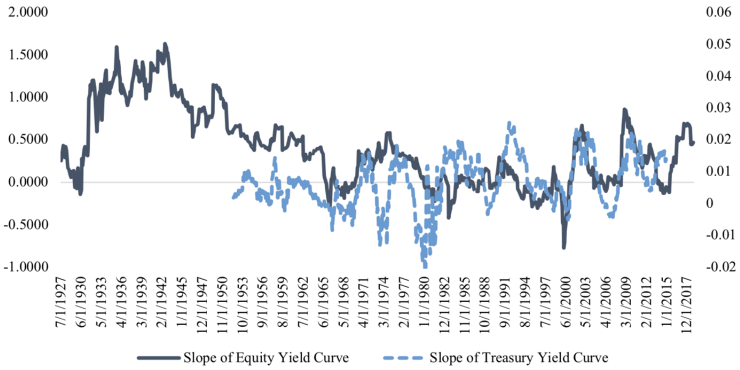
Figure 7: Slope of the Equity Yield Curve



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Alpha and Returns on the Duration Factor

Construct Fama and French (1993)-type Duration factor:

Panel A: US	Long duration		Short duration		Duration factor
	Large cap	Small cap	Large cap	Small cap	
Excess return	0.40	**0.61**	**0.56**	**0.92**	0.23
	(1.83)	(2.24)	(3.90)	(5.44)	(1.91)
CAPM alpha	**-0.22**	-0.08	**0.17**	**0.50**	**0.48**
	(-3.89)	(-0.60)	(3.23)	(5.70)	(5.39)
CAPM beta	**1.24**	**1.40**	**0.79**	**0.85**	**-0.50**
	(98.47)	(45.85)	(66.06)	(43.16)	(-24.69)
Sharpe ratio	0.25	0.30	0.52	0.73	0.26
Information ratio	-0.53	-0.08	0.44	0.77	0.73
Adjusted-R^2	0.94	0.76	0.87	0.74	0.48
# of observations	666	666	666	666	666
Analyst expected growth	13.6%	15.9%	8.1%	8.8%	-6.3%
Realized dividend growth	4.3%	5.7%	1.6%	1.7%	-3.6%

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Summary Stats

	# obs	Mean	Sd	Min	Max
Panel A: Returns and prices					
Annual returns	1,508	0.048	0.21	-1	1.32
Annual returns (using settlement prices)	1,508	0.049	0.21	-1	1.32
Annual log-returns	1,497	0.034	0.22	-2.33	0.84
Annual volume	1,748	11,692	41,281	0	1.07e+06
Open interest	1,748	5,383	15,286	1	341,816
Price of contract	1,748	2,127	3,905	0	69,000
Notional (in thousands)	1,748	4,041	6,959	0	71,781

Panel B: Maturity and Betas					
One-year dummy	1,748	0.36	0.48	0	1
Two-year dummy	1,748	0.32	0.47	0	1
Three-year dummy	1,748	0.22	0.42	0	1
Four-year dummy	1,748	0.090	0.29	0	1
Maturity (in years)	1,748	2.04	0.97	1	5
CAPM beta of strip	1,748	0.52	0.84	-1	1.50
CAPM beta of strip (untrimmed)	1,748	1.58	25.3	-86.8	729
# Obs for CAPM beta	1,748	36.4	27.3	2	101

Summary Stats

Panel C: Sample Representativeness					
Duration	1,748	29.9	28.1	0.079	100
Book-to-market	1,736	53.0	26.2	2.59	100
Market Cap	1,748	97.2	3.13	78.8	100
Operation profit	1,723	63.1	22.3	4.62	99.9
Investment	1,736	49.2	21.9	2.46	98.5
Beta	761	74.4	17.8	10.6	100
Payout	1,703	67.6	21.2	0.38	100

Takeaways:

- Largely representative sample
- Duration slightly shorter than for the average firm in the universe
- Market capitalization much larger than the average firm (avg. firm is in the 97th percentile of the cross-section)

Estimating Expected Return and Sharpe Ratios

- Use I/B/E/S estimates of expeced dividends to estimate expected returns on dividend strips:

$$E_t[r_{t+1}^{i,m}] = \left(\frac{E_t[d_{t+m}^i]}{f_t^{i,m}} \right)^{1/m} \tag{3}$$

where $f_t^{i,m}$ is the futures price at time t for the $t+m$ dividend on firm i.

- Estimate CAPM alpha as

$$\alpha_t^{i,m} = E_t[r_{t+1}^{i,m}] - \beta^{i,m} E_t[r_{t+1}^{mkt}] \tag{4}$$

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Alternative sort form univariate LTG regressions

Panel A: US Sample

Factor	CAPM model			Three-factor model						
	α_{CAPM}	β_{CAPM}	R^2	α_{Three}	β_{Mkt}	β_{Smb}	β_{Dur}	R^2	LTG	# obs
HML	**0.32**	**-0.14**	0.29	-0.08	**0.13**	**0.37**	**-0.62**	0.25	-9.8%	666
	(2.82)	(-5.61)		(-0.76)	(4.10)	(9.35)	(-12.99)			
RMW	**0.28**	**-0.11**	0.39	0.09	**0.12**	**-0.09**	**-0.43**	0.35	-5.0%	666
	(3.69)	(-6.17)		(1.40)	(5.80)	(-3.53)	(-14.26)			
CMA	**0.30**	**-0.15**	0.44	0.07	0.01	**0.22**	**-0.36**	0.31	-6.7%	666
	(4.57)	(-9.73)		(1.16)	(0.65)	(9.61)	(-12.83)			
BETA	**0.56**	**-0.81**	0.12	0.01	**-0.26**	0.02	**-1.09**	0.83	-8.0%	631
	(4.36)	(-28.39)		(0.12)	(-10.26)	(0.65)	(-29.13)			
PAYOUT	**0.24**	**-0.32**	0.13	-0.07	-0.01	0.03	**-0.62**	0.78	-7.0%	666
	(3.51)	(-20.69)		(-1.70)	(-0.81)	(1.66)	(-31.45)			

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Liquidity and Selling Pressure

Dependent variable	Returns	Alpha	Returns	Alpha	Returns	Alpha
2-year dummy	-0.00029	-0.012*	-0.0038	-0.014**	-0.0053	-0.016**
	(0.0059)	(0.0063)	(0.0060)	(0.0064)	(0.0059)	(0.0062)
3-year dummy	-0.0019	-0.026***	-0.0077	-0.030***	-0.0088	-0.031***
	(0.0046)	(0.0061)	(0.0050)	(0.0066)	(0.0053)	(0.0069)
4-year dummy	-0.017***	-0.044***	-0.025***	-0.049***	-0.024***	-0.049***
	(0.0041)	(0.0069)	(0.0039)	(0.0073)	(0.0038)	(0.0073)
Volume (percentile)	-0.000051	-6.5e-06			0.00065**	0.00053
	(0.00017)	(0.00018)			(0.00023)	(0.00029)
Notional (percentile)			-0.00035**	-0.00024*	-0.00088***	-0.00067**
			(0.00012)	(0.00013)	(0.00019)	(0.00022)
Observations	1,255	1,255	1,255	1,255	1,255	1,255
R-squared	0.096	0.100	0.119	0.110	0.148	0.127
Fixed effect	Date/currency	Date/currency	Date/currency	Date/currency	Date/currency	Date/currency
Cluster	Date/Firm	Date/Firm	Date/Firm	Date/Firm	Date/Firm	Date/Firm
Weight	None	None	None	None	None	None

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