# Why the coefficient on the regression is duration..

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- The duration of a straight bond or loan issued by a company can be written in terms of the coupons (interest payments) on the bond (loan) and the face value of the bond to be –

Duration of Bond = 
$$\frac{dP/P}{dr/r} = \frac{\left[\sum_{t=1}^{t=N} \frac{t^*Coupon_t}{(1+r)^t} + \frac{N^*Face Value}{(1+r)^N}\right]}{\left[\sum_{t=1}^{t=N} \frac{Coupon_t}{(1+r)^t} + \frac{Face Value}{(1+r)^N}\right]}$$

- The duration of a bond measures how much the price of the bond changes for a unit change in interest rates.
- Holding other factors constant, the duration of a bond will increase with the maturity of the bond, and decrease with the coupon rate on the bond.

#### **Duration: Comparing Approaches**



#### **Operating Income versus Interest Rates**

 Regressing changes in operating cash flow against changes in interest rates over this period yields the following regression –

Change in Operating Income = 0.1698 – 7.9339 (Change in Interest Rates) (2.69<sup>a</sup>) (1.40)

<u>Conclusion</u>: Disney's operating income has been affected a lot more than its firm value has by changes in interest rates.

### II. Sensitivity to Changes in GDP/ GNP

- How sensitive is the firm's value and operating income to changes in the GNP/GDP?
- The answer to this question is important because
  - it provides insight into whether the firm's cash flows are cyclical and
  - whether the cash flows on the firm's debt should be designed to protect against cyclical factors.
- If the cash flows and firm value are sensitive to movements in the economy, the firm will either have to issue less debt overall, or add special features to the debt to tie cash flows on the debt to the firm's cash flows.

#### **Regression Results**

- Regressing changes in firm value against changes in the GDP over this period yields the following regression –
- Change in Firm Value = 0.0067 + 6.7000 (GDP Growth) (0.06) (2.03<sup>a</sup>)
- **<u>Conclusion</u>**: Disney is sensitive to economic growth
- Regressing changes in operating cash flow against changes in GDP over this period yields the following regression –
- Change in Operating Income = 0.0142 + 6.6443 (GDP Growth)

(0.13) (2.05<sup>a</sup>)

<u>Conclusion</u>: Disney's operating income is sensitive to economic growth as well.

#### III. Sensitivity to Currency Changes

- How sensitive is the firm's value and operating income to changes in exchange rates?
- The answer to this question is important, because
  - it provides a measure of how sensitive cash flows and firm value are to changes in the currency
  - it provides guidance on whether the firm should issue debt in another currency that it may be exposed to.
- If cash flows and firm value are sensitive to changes in the dollar, the firm should
  - figure out which currency its cash flows are in;
  - and issued some debt in that currency

#### **Regression Results**

- Regressing changes in firm value against changes in the dollar over this period yields the following regression –
- Change in Firm Value = 0.1774–0.5705 (Change in Dollar)

(2.76) (0.67)

- <u>Conclusion</u>: Disney's value is sensitive to exchange rate changes, decreasing as the dollar strengthens. However, the effect is statistically insignificant.
- Regressing changes in operating cash flow against changes in the dollar over this period yields the following regression –

Change in Operating Income = 0.1680 – 1.6773 (Change in Dollar)

 $(2.82^{a})$   $(2.13^{a})$ 

<u>Conclusion</u>: Disney's operating income is more strongly impacted by the dollar than its value is. A stronger dollar seems to hurt operating income.

#### IV. Sensitivity to Inflation

- How sensitive is the firm's value and operating income to changes in the inflation rate?
- The answer to this question is important, because
  - it provides a measure of whether cash flows are positively or negatively impacted by inflation.
  - it then helps in the design of debt; whether the debt should be fixed or floating rate debt.
- If cash flows move with inflation, increasing (decreasing) as inflation increases (decreases), the debt should have a larger floating rate component.

#### **Regression Results**

- Regressing changes in firm value against changes in inflation over this period yields the following regression –
- Change in Firm Value = 0.1855 + 2.9966 (Change in Inflation Rate)

(2.96) (0.90)

<u>Conclusion</u>: Disney' s firm value does seem to increase with inflation, but not by much (statistical significance is low)

 Regressing changes in operating cash flow against changes in inflation over this period yields the following regression –

Change in Operating Income = 0.1919 + 8.1867 (Change in Inflation Rate)

(3.43<sup>a</sup>) (2.76<sup>a</sup>)

<u>Conclusion</u>: Disney's operating income increases in periods when inflation increases, suggesting that Disney does have pricing power.

#### Summarizing...

- Looking at the four macroeconomic regressions, we would conclude that
  - Disney's assets collectively have a duration of about 2.33 years
  - Disney is increasingly affected by economic cycles
  - Disney is hurt by a stronger dollar
  - Disney's operating income tends to move with inflation
- All of the regression coefficients have substantial standard errors associated with them. One way to reduce the error (a la bottom up betas) is to use sector-wide averages for each of the coefficients.

#### **Bottom-up Estimates**

These weights reflect the estimated values of the businesses

	Interest	GDP			
Business	rates	Growth	Inflation	Currency	Weights
Media Networks	-3.70	0.56	1.41	-1.23	49.27%
Parks & Resorts	-4.50	0.70	-3.05	-1.58	33.81%
Studio	6.47	0.22	1.45	3 21	
Entertainment	-0.47	0.22	-1.45	-3.21	13.49%
Consumer Products	-4.88	0.13	-5.51	-3.01	2.18%
Interactive	-1.01	0.25	-3.55	-2.86	1.25%
Disney Operations	-4.34	0.55	-0.70	-1.67	100.00%

#### **Recommendations for Disney**

- The debt issued should be long term and should have <u>duration of about 4.3 years</u>.
- A significant portion of the debt <u>should be floating</u> <u>rate debt</u>, reflecting Disney's capacity to pass inflation through to its customers and the fact that operating income tends to increase as interest rates go up.
- Given Disney's sensitivity to a stronger dollar, a portion of the debt should be in foreign currencies. The specific currency used and the magnitude of the foreign currency debt should reflect where Disney makes its revenues. One simple proxy is the 18% that Disney derives in revenues from outside the US.

## Analyzing Disney's Current Debt

- Disney has \$14.3 billion in interest-bearing debt with a face-value weighted average maturity of 7.92 years. Allowing for the fact that the maturity of debt is higher than the duration, this would indicate that Disney's debt may be a little longer than would be optimal, but not by much.
- Of the debt, <u>about 5.49% of the debt is in non-US dollar currencies (Indian rupees and Hong Kong dollars</u>), but the rest is in US dollars and the company has no Euro debt. Based on our analysis, we would suggest that Disney increase its proportion of Euro debt to about 12% and tie the choice of currency on future debt issues to its expansion plans.
- Disney has no convertible debt and about 5.67% of its debt is floating rate <u>debt</u>, which looks low, given the company's pricing power. While the mix of debt in 2013 may be reflective of a desire to lock in low long-term interest rates on debt, as rates rise, the company should consider expanding its use of foreign currency debt.

### Adjusting Debt at Disney

- It can <u>swap some of its existing fixed rate, dollar debt for</u> <u>floating rate, foreign currency debt</u>. Given Disney's standing in financial markets and its large market capitalization, this should not be difficult to do.
- If Disney is planning new debt issues, either to get to a higher debt ratio or to fund new investments, it can use primarily floating rate, foreign currency debt to fund these new investments. Although it may be mismatching the funding on these investments, its debt matching will become better at the company level.

#### Debt Design for Bookscape & Vale

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- Bookscape: Given Bookscape's dependence on revenues at its New York bookstore, we would design the debt to be

<u>Recommendation</u>: Long-term, dollar denominated, fixed rate debt <u>Actual</u>: Long term operating lease on the store

Vale: Vale's mines are spread around the world, and it generates a large portion of its revenues in China (37%). Its mines typically have very long lives and require large up-front investments, and the costs are usually in the local currencies, but its revenues are in US dollars.

Recommendation: Long term, dollar-denominated debt (with hedging of local currency risk exposure) and if possible, tied to commodity prices.

<u>Actual</u>: The existing debt at Vale is primarily US dollar debt (65.48%), with an average maturity of 14.70 years. All of the debt, as far as we can assess, is fixed rate and there is no commodity-linked debt.

### And for Tata Motors and Baidu

- Tata Motors: As an manufacturing firm, with big chunks of its of its revenues coming from India and China (about 24% apiece) and the rest spread across developed markets.
  - <u>Recommendation</u>: Medium to long term, fixed rate debt in a mix of currencies reflecting operations.
  - <u>Actual</u>: The existing debt at Tata Motors is a mix of Indian rupee debt (about 71%) and Euro debt (about 29%), with an average maturity of 5.33 years and it is almost entirely fixed rate debt.
- Baidu: Baidu has relatively little debt at the moment, reflecting its status as a young, technology company.
  - Recommendation: Convertible, Chinese Yuan debt.
  - <u>Actual</u>: About 82% of Baidu's debt is in US dollars and Euros currently, with an average maturity of 5.80 years. A small portion is floating rate debt, but very little of the debt is convertible.

### RETURNING CASH TO THE OWNERS: DIVIDEND POLICY

"Companies don't have cash. They hold cash for their stockholders."

#### **First Principles**



# Steps to the Dividend Decision... if it is treated as a residual claim





### The Roots of Dividend Dysfunction

- In practice, dividend policy is dysfunctional and does not follow the logical process of starting with your investment opportunities and working your way down to residual cash.
- The two dominant factors driving dividend policy around the world are:
  - Inertia: Companies seem to hate to let of their past, when it comes to dividend policy.
  - Me-too-ism: Companies want to behave like their peer group.

#### I. Dividends are sticky

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In 2020, a crisis year for many companies...here is what they did..

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- Of the S&P 500 companies, 287 companies increased their dividends and 11 companies initiated dividends.
- Of the S&P 500 companies, 27 decreased dividends and 42 suspended dividends.
  - While the 42 dividend suspensions were the most in the last 20 years, the number of companies that increased divbidends (298) vastly exceeded the number that cut or suspended dividends (69).
  - In perhaps the most revealing statistic of all, 133 of the 500 largest market cap companies did not pay dividends leading into 2020 or in 2020.

#### II. Dividends tend to follow earnings

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Aswath Damodaran

#### III. Are affected by changes in tax laws...

#### In 2003



Tax rates on dividends brought down to the tax rate on capital gains in 2003

#### In the last quarter of 2012

- As the possibility of tax rates reverting back to pre-2003
   levels rose, 233 companies
   paid out \$31 billion in dividends.
- Of these companies, 101
  had insider holdings in excess of 20% of the outstanding stock.