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Last Lecture
• **Managing TE**
  - Futures/forwards
  - Options (with different strike prices).
      Typical insurance tradeoff: high cost (high premium), good coverage (higher floor for puts/lower cap for calls)
• **Managing Translation Exposure**
  - Use futures/forwards, options. Not very interesting (check book).
• **Managing EE**
  - Recall Laker Airlines. Main tool: Match inflows and outflows denominated in FC.

Chapter 12 - Managing Economic Exposure

Brief Review (Chapter 10)

EE: It measures how future CFs are affected by percentage changes in S_t (e_f).

Measures: 1) Accounting measures (simulate EAT under different exchange rates)
                      2) Regressions using CFs or stock market returns.

Q: Is EE significant –i.e., should we do something about it?
A) Use a regression. Measure an elasticity and make a judgment call.

If we determine that EE is significant, then a firm should try to manage it.

Idea: To avoid EE, we would like to have constant CFs at different exchange rates (CFs: Free CFs, EAT). A firm can restructure operations (*operational hedge)* to reduce EE.

Typical operational hedges: Move production abroad (build/expand a plant), buy more inputs abroad.

Example: A U.S. firm exports to the Australia. Two different FX scenarios:
(1) S_t = 1.00 USD/AUD
        Sales   in US   USD 11M
                in Aus AUD 15M
        Cost of goods in US   USD 5M
                        in Aus AUD 8M
(2) S_t = 1.10 USD/AUD
        Sales   in US   USD 12M
                in Aus AUD 18M
        Cost of goods in US   USD 5.5M
                        in Aus AUD 10M

Taxes: US   30%

Aus 40%
Interest: US USD 5M
Aus AUD 1M

CFs under the Different Scenarios (in USD)

	$S_t = 1$ USD/AUD	$S_t = 1.1$ USD/AUD
Sales	11M +15M = 26M	12M + 19.8M=31.8M
CGS	5M + 8M = 13M	5.5M + 11M = 16.5M
Gross profit	5M + 7M = 13M	5.5M + 11M = 15.3M
Int	5M + 1M = 6M	5M + 1.1M = 6.1M
EBT	6M	9.2M
Tax	0.3M + 2.4M = 2.7M	0.45M + 3.08M = 3.53M
EAT	**4.3M**	**5.67M**

Q: Is the change in EAT significant?
Let's calculate the CF-exchange rate elasticity: Change in EAT(%)/$e_{f,t}$ = .3186/.1= 3.186
$\Rightarrow$ A 1% depreciation of the USD, EAT increases by 3.2% (probably, very significant!). That is, this company benefits by an appreciation of the AUD against the USD. The firm faces economic exposure. ¶

How can a U.S. exporting firm avoid (or reduce) economic exposure? (Short answer: Match!)
1. Increase US sales
2. Borrow more in AUD (increase outflows in AUD)
3. Increase purchases of inputs from Australia (increase CGS in AUD)

Note: A U.S. importing firm can reduce EE by taking the reverse steps.

Diversification always helps to reduce economic exposure. By diversifying a company takes a portfolio approach to inflows and outflows denominated in different currencies.

Example: In the previous (baseline) example, we'll play with scenarios (one at a time).
(A) US firm increases US sales by 25% (unrealistic!)
EAT($S_t = 1$ USD/AUD) = USD 6.225M
EAT($S_t = 1.1$ USD/AUD) = USD 7.77M
  $\Rightarrow$ a 1% depreciation of the USD, EAT increases by only 2.48%.

(B) US firm borrows only in AUD: AUD 6M
EAT($S_t = 1$ USD/AUD) = USD 4.8M
EAT($S_t = 1.1$ USD/AUD) = USD 5.87M
  $\Rightarrow$ a 1% depreciation of the USD, EAT increases by 2.23%.

(C) US firm increases Australian purchases by 30% (decreasing US purchases by 30%)
EAT($S_t = 1$ USD/AUD) = USD 3.91M
EAT($S_t = 1.1$ USD/AUD) = USD 4.845M

$\Rightarrow$ a 1% depreciation of the USD, EAT increases by 2.39%.

(D) US firm does (A), (B) and (C) together
EAT(S_t = 1 USD/AUD) = USD 6.335M
EAT(S_t = 1.1 USD/AUD) = USD 7.145M
$\Rightarrow$ a 1% depreciation of the USD, EAT increases by 1.28%.

Note: You can find this example (and play with different values) in my homepage:
www.bauer.uh.edu/rsusmel/4386/ee-example.xls ¶

Remark: Some firms will always be exposed. For example, U.S. small firms that only do business in the U.S. and import parts from abroad (say, a store selling Chinese food and goods in Houston's Chinatown) do not have a lot of opportunities to reduce EE. For them, a strong USD is good for their CFs; while a weak USD is not. Large firms have more leeway in adjusting their business structure to reduce EE.

Case Study: Walt Disney Co.

For a long time, Disney (DIS) tried to grow from within, without major acquisitions. Starting in 1993, with the acquisition of Miramax in 1993, DIS has gone in an acquisition spree (Capital Cities/ABC/ESPN, Fox Family, The Muppets, Pixar, Marvel, Lucasfilm, BAM, 21st Century Fox, etc.), that transformed the company founded in 1923.

Four divisions (in 2006): Entertainment (Studios), Consumer Products, Theme Parks and Resorts, and Media Networks.

S_{06} = 108.113 TWC/USD (TWC = Trade-weighted currency)
Price$_{06}$ = USD 30.90

Inflows (2006 **Revenue: USD 34.3B, Operating income: USD 6.49B, EPS: USD 2.06**):
- Media (ABC, ESPN, Disney Channel, A&E. *Low*). **Revenue: 14.75B, OI: 3.61B**
- Parks & Resorts (Disney Cruise Line & 10 parks: Euro Disney, Tokyo Disney + HK park, U.S. (30% from abroad). *Medium*). **Revenue: 9.95B, OI: 1.53B**
- Studios (Disney, Pixar, Touchstone. 50+% from abroad. *High*). **Revenue: USD 7.2B, OI: 0.73B**
- Consumer products (Licensing, Publishing, Disney store (Europe). *Medium*) **Revenue: USD 2.4B, OI: 0.62B**
 Outflows - 80% in USD

S_{06} = 108.113 TWC/USD (TWC = Trade-weighted currency index)
Price$_{06}$ = USD 30.90

UPDATE (2006-2013):
- DIS bought Marvel for USD 4B in 2009 and Lucasfilm for USD 4B in 2012.

- DIS introduced a new division: Interactive Media (Kaboosee.com, BabyZone.com, Playdom (social gaming), etc.)
- DIS ordered two new cruises with 50% more capacity each in 2011.
- Shangai theme park to be opened in 2016.

Economic Exposure? Yes. Probably: Medium

• <u>Note</u>: To check our intuition, we can calculate a pseudo-elasticity to check EE. We need data. Let's use 2013 data:

Inflows (2013 **Revenue: USD 45.04B, Operating income: USD 10.72B, EPS: USD 3.38**):
S_{13} = 101.923 TWC/USD   (USD depreciated by 5.73% against the TWC)
$Price_{13}$ = USD 65.30.

Summary:

	2006 (in USD)		2013 (in USD)	
	Revenue	**Operating Income**	**Revenue**	**Operating Income**
Media	14.75B	3.61B	20.35B	6.82B
Parks & Resorts	9.95B	1.53B	14.09B	2.22B
Studios	7.2B	0.73B	5.98B	0.66B
Consumer Products	2.4B	0.62B	3.56B	1.11B
Interactive Media			1.06B	-0.09B
Total	**34.3B**	**6.49B**	**45.04B**	**10.72B**

13-06 Change in Revenue = USD 10.74B (31.31%)
13-06 Change in OI = **USD 10.72B** – **USD 6.49B** = USD 4.23B (**65.18%)**
13-06 DIS Stock Return = **111.32%**
13-06 $e_{f,t}$ = - 0.05725 (or 5.73% depreciation of the USD)

CF-elasticity = % Change in OI / % Change in S_t = **.6518**/-.05725 = -11.385

If stock market numbers are more trusted than accounting numbers, recalculate CF-elasticity:
CF-elasticity = DIS Stock Return/$e_{f,t}$ = **1.1132**/-.05725 = **-19.445**. (Interpretation: a 1% USD depreciation, increases stock returns by **19.445%**.)

According to these elasticities, both very high, DIS behaves like a net exporter, a depreciation of the USD increases cash flows.

• Managing Disney's EC
    1. increase expenses in FC
       a. make movies elsewhere

   b. move production abroad
   c. Borrow abroad
  2. Diversify revenue stream
   a. Build more parks abroad
   b. New businesses

• Let's revisit the measurement Disney's EE.
Q: Is the pseudo-elasticity informative? Is S_t the only variable changing from 2006 to 2013?
A: No! DIS added assets, then more revenue and OI are expected. Also the economy and the stock market grew during these dates. We need to be careful with these numbers. We need to "control" for these changes, to isolate the effect of $e_{f,t}$.

A multivariate regression will probably be more informative, where we can include other independent ("control") variables (income growth, inflation, sales growth, assets growth, etc.), not just $e_{f,t}$ as determinants of the change in OI (or DIS stock return).

We can also borrow from the investments literature and use the popular 3 Fama-French factors (Market, Size, Book-to-Market) as controls. Say:
   DIS Stock Return$_t = \alpha + \beta\ e_{f,t} + \theta\ \text{Assets}_t + \delta\ \text{FF Factors}_t + ... + \varepsilon_t$

Example: Disney's EE.
Using Disney's monthly excess returns from the past 35 years (1984:Jan, 2019:June), we run a regression against $e_{f,t}$ (using USD/TWC) and the Fama-French factors (Market, SMB, HML):

$R^2 = 0.4188$
Standard Error $= 1.6115$
Observations $= 424$

	Coefficients	Standard Error	t Stat	P-value
Intercept	-0.18460	0.13040	-1.4160	0.1576
$e_{f,t}$	**0.19250**	0.23412	**0.8223**	0.4114
Market - r_f	0.51853	0.03068	**16.900**	>.00001
SMB	-0.02080	0.04377	-0.4750	0.6348
HML	0.10089	0.04647	**2.1708**	0.0305

Note that the coefficients corresponding to $e_{f,t}$ is **0.1925.** That is, a 1% depreciation of the USD, increases stock returns by 0.1925%. A substantially smaller, and more realistic, figure than the one implied by the elasticity above.

After controlling for other factors that also affect Disney's excess returns, we cannot reject H$_0$, since $|t_\beta =$-**0.82**$| < 1.96$ (at 5% level, no EE).

The results do not change if we use a longer sample (1973-2019) or a shorter sample (1993-2019). The β coefficient is not statistically (the t-stat is never bigger than 1 in absolute value).

Q: Why is economic exposure not showing up? Disney has been diversifying and taking a lot of the measures discussed above to reduce economic exposure for many years. It seems to be working. ¶

• **EE: Evidence**
Using a regression like the one above for Disney, Ivanova (2014) estimates the EE for 1,231 U.S. firms. She finds that the mean β is 0.57 (a 1% USD depreciation increases returns by 0.57%). However, only 40% of the EE are statistically significant at the 5% level. In general, large firms have lower exposures (average β is 0.063).

He and Ng (1998) and Doukas et al. (2003) find that only 25% of Japanese firms have significant EE.

Interesting result: Ivanova reports that 52% of the EEs come from U.S. firms that have no international transactions (a higher S_t "protects" these domestic firms).

• **Should a Firm Hedge?**
There are two views with respect to hedging at the firm level:
        - Based on the Modigliani-Miller Theorem (MMT). It states that hedging adds nothing to the value of a firm.
        - Exploits some of the basic assumptions underlying the MMT. This second view analyzes specific situations where hedging might add value to a firm.

1. MMT: Hedging is Irrelevant
When we value a firm, the financing source of those good investments is irrelevant. Different mechanisms of financing determine how the CFs are divided among the different classes of investors (shareholders or bondholders).

The MMT depends on a set of assumptions about financial markets. These assumptions basically require that a firm operates in perfect markets (i.e., no transaction costs, no distortions, etc.).

Implications for hedging: If the methods of financing and the character of financial risks do not matter, managing them is not important, and, thus, should not add any value to a firm. On the contrary, since hedging is not free, hedging might reduce the value of a firm.

Modigliani and Miller also show that if investors want to reduce the financial risks associated to holding shares in a firm, they can diversify their portfolios by themselves.

2. Hedging Adds Value
The assumptions behind the MMT are routinely violated and, then the MMT does not hold. Under these circumstances, hedging adds value to a firm. The added value of hedging is still open to discussion.

2.1 Investors might not be able to replicate an optimal hedge

Investors might not be big enough to have access to optimal hedges. Or investors might not have enough information about CFs, denominated in different currencies, of the firm.

2.2 Hedging as a tool to reduce the risk of bankruptcy
If CFs are very volatile, a firm might be faced with the problem of needing cash to meet its debt obligations. Thus, firms, like MNCs, with good access to credit markets have no need to hedge. (Surprisingly, U.S. largest corporations are the biggest hedgers.)

2.3 Hedging as a tool to reduce investment uncertainty
Firms should hedge to ensure they always have sufficient cash flows to fund their planned investments.

2.4 Hedging as a tool to reduce investment uncertainty
Tax convexity –i.e., tax liability is progressively increasing with income– works in favor of hedgers. Thus, firms that hedge can expect to reduce their taxes by reducing income volatility. In addition, given that firms that hedge can borrow more, they can take advantage of the tax deductibility of interest.

- **Hedging: Some Conclusions**
- We have seen two extreme views:
(1) Hedging adds no value (actually, may decrease value). In practice, this view understands the potential benefits (lower distress costs and taxes), but diversified investors can manage risk exposure by themselves.
(2) Hedging adds value. In practice, this view understands that markets are efficient, but the reduction in uncertainty improves stock prices.

- There is an intermediate view:
- Hedging is likely to add value for:
    ◦ Small firms with undiversified ownership.
    ◦ Firms with a lot of debt.
    ◦ Firms with limited growth opportunities if financially constrained.
    ◦ Firms with risk that cannot be hedged by market instruments.

- **Who Hedges? And How?**
U.S. Evidence
A 1998 Wharton U.S. survey on hedging reported the following main findings:
- *Size matters*: 83% of big firms hedge, while on 12% of small firms hedge.
- *Industry matters*: primary product firms (68%) and manufacturers (48%) hedge more than service firms (42%).
- *Hedge only a fraction of the total FX exposure*. The average firm hedges less than 50% of the perceived FX exposure. This practice is called *selective hedging*.
- *Short-dated hedges*: 82% of firms use FX derivatives with a maturity of 90 days or less.
- *Standard options most popular*. Firms use standard European-style or American-style options much more than such exotic options as average rate, basket, or barrier options.

- *Speculation*: 32 % of firms that use FX derivatives reported that their market view of exchange rates leads them to "actively take positions" at least occasionally.

More Results:
- For equity markets, FX hedging in the long run does not significantly improve returns –see Statman and Fisher (2003), Thomas (1988).
- For equity markets, FX hedging does not increase well-diversified portfolio returns, nor always reduces risk. MSCI Barra Research Paper No. 2009-12.
- For bond markets, fully FX hedging is the best policy for risk-minimizing investor. Schmittmann (2010), IMF Working Paper 10/151.
- For the gold industry, firms engaging in selective hedging do not add to their performance. Brown, et al. (2006) "Are firms successful at selective hedging?", *Journal of Business*, 79, 2925-2949.
- For the gold industry, firms engaging in selective hedging are closer to financial distress. Adam et al. (2012) "Why do Firms engage in selective hedging?" SFB 649 Working Paper, Humboldt University.

Canadian Evidence

The Bank of Canada conducts an annual survey of FX hedging. The main findings from the 2011 survey are:
• Companies hedge approximately 50% of their FX risk.
• Usually, hedging is for maturities of six months or less.
• Use of FX options is relatively low, mainly because of accounting rules and restrictions imposed by treasury mandate, rules or policies.
• Growing tendency for banks to pass down the cost of credit (credit valuation adjustment) to their clients.
• Exporters were reluctant to hedge because they were anticipating that the CAD would depreciate. On the other hand, importers increased both their hedging ratio and duration.

Australian Evidence

The National Bank of Australia also conducts a survey, every four years since 2001, to gauge Australia's aggregate foreign currency exposure.
• The banking sector hedges all of its net FC liability exposure, while other financial corporations hedge only part of their net FC exposure.
• Overall, financial sector liabilities in FC (bonds, loans and deposits) had a hedge ratio of 60%, while assets in FC had a hedge ratio of 30%.
• 80% of FC denominated debt security liabilities was hedged using derivatives, reflecting a hedge ratio of 84% for short-term debt liabilities and 77% for long-term debt securities.
• Non-financial corporations hedged close to 30% of FC denominated liabilities, while there was almost no hedging of FC denominated assets.

Chapter 13 - International Financial Management

In this chapter we start the second of the course. In the first part, we have concentrated on issues related to FX Rates. From now on, we will study issues related to a company dealing in an international environment.

The first topic involves *Direct Foreign Investment* (DFI), a decision a firm makes to invest in a foreign country.

- **DFI**
The chapter is motivated through a firm's evaluation of two alternatives:
- A domestic firm can produce at home and export production.
- A domestic firm can also invest to produce abroad (& do a DFI).

DFI requires capital, sometimes a lot of capital, and, thus, are difficult to reverse.

Q: Why DFI over export?
A: Avoid tariffs and quotas
        Access to cheap inputs
        Reduce transportation costs
        Usage of scare input
        Take advantage of government subsidies
        Reduce economic exposure
        Diversification
        Management of local expertise
        Real option (investment today helps you make investments elsewhere, later).

CHAPTER 12 – BRIEF ASSESMENT

1. Padres Company does business in the U.S. and Australia. In attempting to assess its economic exposure, it compiled the following information:
• Its U.S. sales are somewhat affect by the Australia dollar's value because it faces competition from Australian exporters. It forecasts the U.S. sales based on the following exchange rate scenarios:

S_t (USD/AUD)	Revenue from U.S. (in million)
.70	USD 180
.85	USD 250

• Its AUD revenues on sales to Australian residents invoiced in AUD are expected to be AUD 400,000,000.
• Its anticipated cost of goods sold is estimated at USD 60 million from the purchase of U.S. material and AUD 100 million from the purchase of Australian materials.
• Fixed operating expenses are USD 20 million.
• Variable operating expenses are estimated at 15 percent of total sales (including Australian sales, translated to a USD amount).
• Interest expense is estimated at AUD 30 million on existing Australian loans, and USD 20 million on existing USD loans.
• Income tax is paid at the U.S. effective tax rate of 27%.

A. Create a forecasted income statement for Padres under each of the two exchange rate scenarios.
B. Explain how Padres' projected earnings before taxes are affected by possible exchange rate movements.
C. Explain how Padres can restructure its operations to reduce the sensitivity of its earnings to exchange rate movements, without reducing its volume of business in Australia.

2. In the previous exercise, calculate the CF-elasticity under the following scenarios (one at a time):
(A) Padres Co. increases US sales by 25% (unrealistic!)
(B) Padres Co. only in AUD:
(C) Padres Co. increases Australian purchases by 30% (decreasing US purchases by 30%)
(D) Padres Co. does (A), (B) and (C) together.

3. Below, we report GE's net income (in millions, USD) and earnings per share, EPS, along the USD/TWC exchange rate for the period 2012-2016. (Whole income statement on my homepage: http://www.bauer.uh.edu/rsusmel/4386/ GE_Income_Statement.csv). Does GE face EE?

	2016	**2015**	**2014**	**2013**	**2012**
Net income (in M)	8,175	-6,126-	15,233	13,057	13,641
EPS	0.89	-0.61	1.5	1.27	1.29
USD/TWC	1.044244	1.05869	1.114673	1.308284	1.361726