## 2220 - Entrepreneurial Finance and Venture Capital

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Lecture #3

# Business models and cash flow curves



- Different business models and growth trajectories generate different cash flow patterns
- These differences are particularly important in entrepreneurial finance
  - They lead to very different funding needs
  - External finance is scarce/expensive for startups

## A three-stage, three-parameter model

• Introduce a simple model to develop understanding of how business models, growth and cash flows are linked

- Cash flows are a function of two key business model parameters profitability and asset intensity – and sales growth
- ② Life cycle is split intro three stages: startup, growth and steady-state
- Profitability, asset intensity and growth are assumed constant within each stage

## Input parameters

Profitability: 
$$p_t = rac{\mathsf{EBIAT}}{\mathsf{Sales}}$$
 in year t

Asset intensity: 
$$a_t = \frac{\text{NOA in year t}}{\text{Sales in year t}}$$

Growth: 
$$g_t = rac{\text{Sales in year t}}{\text{Sales in year t-1}} - 1$$

#### Free Cash Flow formula

• Using these parameters and letting S denote sales we can write

$$FCF_t = EBIAT_t - \Delta NOA_t$$
$$= p_t S_t - (a_t S_t - a_{t-1} S_{t-1})$$

• Noting that  $S_{t-1} = S_t/(1+g_t)$  we can rewrite this as

$$FCF_t/S_t = p_t - a_t \frac{g_t}{1+g_t} - \frac{a_t - a_{t-1}}{1+g_t}$$

• If  $a_t = a_{t-1}$  then we can simplify further

$$FCF_t/S_t = p_t - a_t \frac{g_t}{1 + g_t}$$

Why is this distinction useful?

$$FCF_t/S_t = p_t - a_t \frac{g_t}{1+g_t}$$

- Profitability p reflects cash flows that scale with the *level* of sales
- Asset intensity a reflects cash flows that scale with sales growth
- *p* and *a* have very different implications for the shape of cash curves in high-growth ventures



# Goal for today

- Build intuition
  - What business model choices determine p and a?
  - What do these parameters look like for different industries?
  - How do p, a and g interact to determine cash flow curves, funding needs and valuation?

- Note this is a simplified model, but it can easily be extended
  - Annual/monthly values
  - Fixed costs or CAPEX