

Wireless!

The forces and strategies that shaped a revolution



Lecture 21-

**We Bulldoze and cellular- Lessons in growth
and fast depreciation**

Lecture 21- Classwork

1. Please summarize in 3-4 sentences the Pre-Lecture reading for Lecture 21. What are some important takeaways from your reading?
2. We saw that fast depreciation could allow We Bulldoze to double in size and profitability, but what if there is only enough business for 10 bulldozers? If that is the case, is fast depreciation useful?
3. What do you think would have happened to the cellular business if the government chose a more appropriate depreciation period, like 25-30 years?

Creating a simple “public” business: We Bulldoze, inc.

- ❑ A business that owns bulldozers and does contract work on construction, mostly for developers.
- ❑ We want to buy 10 bulldozers at \$1M each
 - Depreciated over 10 years
- ❑ We will charge \$250 / hour, and expect 2000 working hours/bulldozer/year
- ❑ We will rent a building for \$50K /year
- ❑ We will employ one manager @ \$150K, 10 operators @ 120K, one office manager @ 30K, one maintenance person for \$70K, fuel/parts at \$100K
- ❑ To raise the money for our bulldozers, we sell 1M shares of stock at \$10 / share

Financing our company with equity

- We will sell 1M shares of stock for \$10 each
 - Why not 10M shares for \$1 each, or 10 shares for \$1M each?
- Real issue is % ownership
 - An investment of \$100K gives us 1% of the company, and 1% of the profits
- “Founders” may take a percent of the shares without paying, and startups often give additional shares to early employees as an incentive.
 - Such practices are said to “dilute” the value of the shares that investors buy.

Balance sheet before and after purchase of bulldozers

Assets

\$10M

Cash

\$10M

Liabilities & Paid-in Eq

\$10M

Equity

\$10M

Assets

\$10M

Cash

\$0

*Equipment

\$10M

Liabilities & Paid-in Eq

\$10M

Equity

\$10M

*10 Bulldozers @ \$1M ea

The “business plan” financials for the 1st year

Balance Sheet
after Purchase of
equipment

Assets \$10M

Cash	\$0
Equipment	\$10M

**Shareholders’
Equity \$10M**

Results of 1st year
operations

Revenue \$5.00M

Expenses \$3.50M

Salaries	\$1.450M
fuel	\$0.80M
Maintenance	\$0.20M
Rent	\$0.05M
Depreciation	\$1.00M

BT Earnings \$1.50M

Tax \$0.50M

AT Earnings \$1.00M

**Divd \$1/share \$1.00M
(10% return on shares)**

Balance Sheet
after 1st year

Assets \$10M

Depr acct	\$1M**
Equipment	\$9M*

**After 10 years, we
will have \$10M in a
“depreciation
account” to buy new
bulldozers, so the
company can go on!

*10 Bulldozers
(depreciated)

**Shareholders’
Equity \$10M**

Instead of paying a dividend we could buy another bulldozer (creates earnings growth)

Balance Sheet
after 1st year

Assets \$11M
Depr acct \$ 1M
Equipment \$10M*

**Liabilities &
Paid-in Eq \$11M**
Equity \$10M
Retained earn \$ 1M

*11 Bulldozers
(10 depreciated)

Results of 2nd year
operations

Revenue \$5.50M

Expenses \$3.81M
Salaries \$1.57M
fuel \$0.88M
Maintenance \$0.21M
Rent \$0.05M
Depreciation \$1.10M

BT Earnings \$1.69M
Tax \$0.56M
AT Earnings \$1.13M
Dividend \$1.13M
Shares worth \$11.30
After first year?

Balance Sheet
after 2nd year

Assets \$11.00M
Depr acct \$ 2.10M
Equipment \$ 8.90M

**Liabilities &
Paid-in Eq \$11.00M**
Equity \$10.00M
Retained earn \$ 1.00M

Is reinvesting the first year's dividend good?

- ❑ Looking at the 2nd year P&L: based on the larger business we now have, our earnings increase to \$1.13M, or \$1.13 per share.
- ❑ Let's assume that we pay this dividend to the stockholders. It's 13 cents more per share than they would have gotten without the new bulldozer, but they gave up \$1 per share last year. What happened to that 10% that they didn't get?
- ❑ 2 ways to look at this
 - ❑ One way is that they own the same fraction of a company whose equity is larger by 10%
 - ❑ Second way (better) is that people are willing to pay \$10 for a share that earns \$1, they will pay \$11.30 for a share that earns \$1.13. Thus, after two years, our shareholders now have shares worth \$1.30 more than they paid for them, plus a dividend of \$1.13. Instead of owning a \$10 share plus \$2 in dividends, they own an \$11.30 share plus \$1.13 in dividends.
 - ❑ Even if we assume they could have invested the first \$1 dividend somewhere else and made 10 cents on it in the second year, they would have only \$12.10 in total value. Here they have \$12.43.
- ❑ Reinvestment is a good thing, if the company can do better with the money than the stockholder can.

Instead of paying a dividend we could buy another bulldozer (creates earnings growth)

Balance Sheet
after 1st year

Assets \$11M
Depr acct \$ 1M
Equipment \$10M*

**Liabilities &
Paid-in Eq \$11M**
Equity \$10M
Retained earn \$ 1M

*11 Bulldozers
(10 depreciated)

Results of 2nd year
operations

Revenue \$5.50M

Expenses \$3.81M
Salaries \$1.57M
fuel \$0.88M
Maintenance \$0.21M
Rent \$0.05M
Depreciation \$1.10M

BT Earnings \$1.69M
Tax \$0.56M
AT Earnings \$1.13M
Dividend \$1.13M
Shares worth \$11.30
After first year?

Balance Sheet
after 2nd year

Assets \$11.00M
Depr acct \$ 2.10M
Equipment \$ 8.90M

**Liabilities &
Paid-in Eq \$11.00M**
Equity \$10.00M
Retained earn \$ 1.00M

Or we could use the \$1M in our “depreciation account” to buy a new bulldozer

Balance Sheet
after 1st year

Assets \$11M
Depr acct \$ 0
Equipment \$10M*

**Liabilities &
Paid-in Eq \$10M**
Equity \$10M
Retained earn \$ 0

*11 Bulldozers
(10 depreciated)

Results of 2nd year
operations

Revenue \$5.50M

Expenses \$3.81M
Salaries \$1.57M
fuel \$0.88M
Maintenance \$0.21M
Rent \$0.05M
Depreciation \$1.10M

BT Earnings \$1.69M
Tax \$0.56M
AT Earnings \$1.13M
Dividend \$1.13M

Shares worth \$11.30
After first year?

Balance Sheet
after 2nd year

Assets \$10M
Depr acct \$ 1.1M
Equipment \$ 8.90M

**Liabilities &
Paid-in Eq \$10.00M**
Equity \$10.00M
Retained earn \$ 0

The reality of depreciation

- ❑ Depreciation is simply a tax break
 - The logic is that things wear out and need to be replaced
- ❑ But there are no rules on how it is spent
 - It could buy ten more bulldozers (big growth)
 - ❑ With tax-free money
 - But that creates a problem when the 1st 10 bulldozers need to be replaced
 - ❑ New investors? They would share the growth and reduce the value of the existing shares.
- ❑ But what if the bulldozers really last 20 years?
 - 20-year life with 10-year “fast” depreciation changes everything
 - ❑ We can double the bulldozers using tax-free depreciation and still replace them all with depreciation

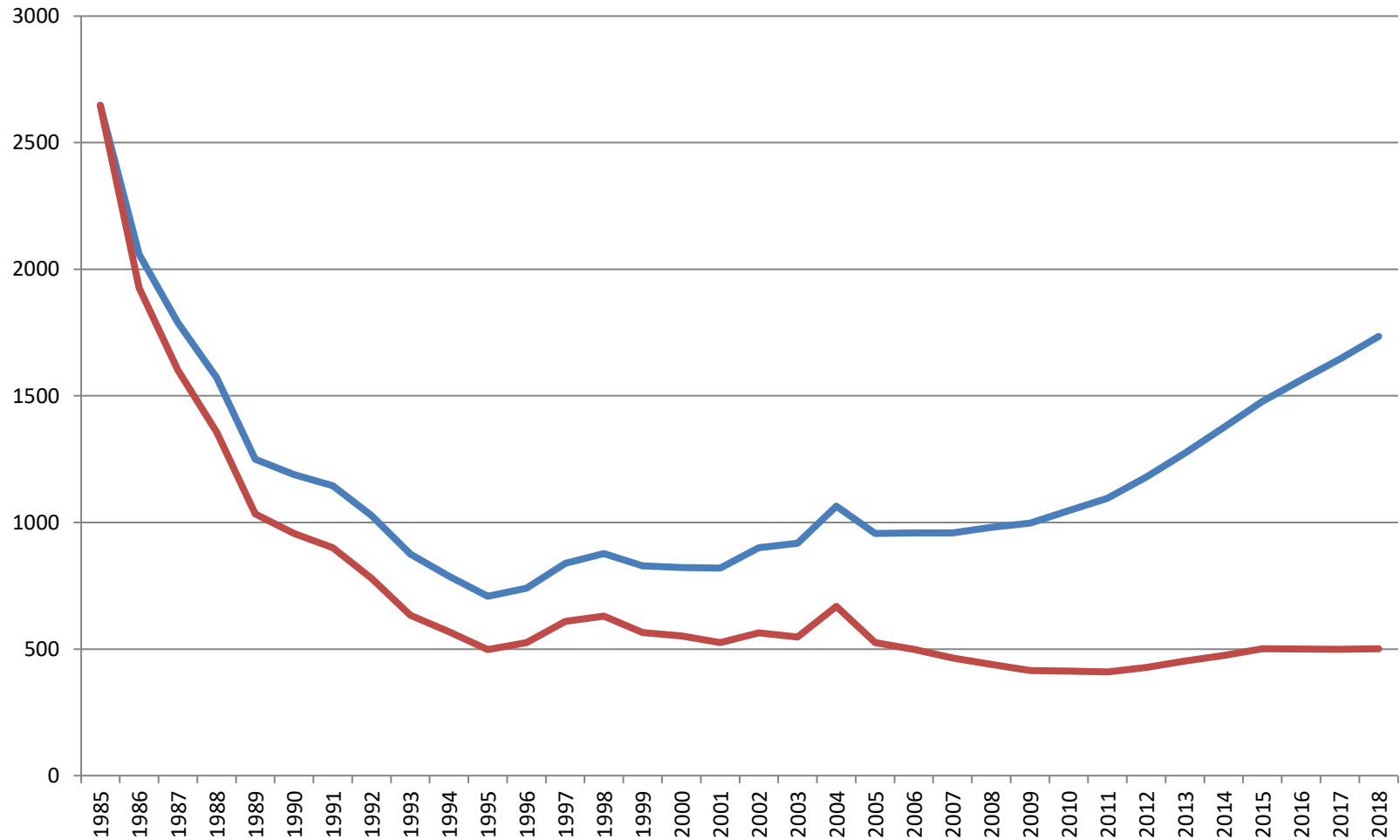
Q2

In Cellular, the million-dollar cell mostly doesn't need to be replaced or repaired

- ❑ 10% depreciation was typical for radio equipment, but it's "fast depreciation" for those million-dollar cellular base stations.
 - Most of the \$1M doesn't depreciate much, if at all (land, building, mast, connection to the switch, "capitalized" legal fees)
 - Almost all that depreciation money (\$100K per year per base station) can be spent on growth (new base stations)
 - ❑ We don't need new investors so the profits aren't shared
 - The amortization of spectrum can also be spent
 - ❑ Spectrum doesn't wear out either
 - ❑ Depreciation and amortization paid for 70% of growth

The 10-year “fast depreciation” masked the huge increases in investment

Total spending for base stations (CAPEX) vs New investment/user



Benefit of Fast Depreciation

Hypothetical financials with depreciation
for a nationwide 4G system with 100M users

Balance Sheet (after depreciation and amortization)

100M users at \$2K/user=	\$ 50B
Spectrum (a guess)=	\$ 30B
Total Assets =	\$80B
Shareholder equity	\$80B

Results of operations

Revenue @ \$50/month/user	\$60B
TOT Expenses	\$22B
SG&A	\$15B
Depreciation (10 yr)	\$ 5B
Amortization	\$ 2B
BT Earnings	\$38B
Tax	\$13B
AT Earnings	\$25B
Return on equity	31%!!

This is obviously quite high, but shareholders in an established company don't measure profit against some ancient depreciated assets. They measure profit against current share price.

The chaos behind what seems like a very stable business

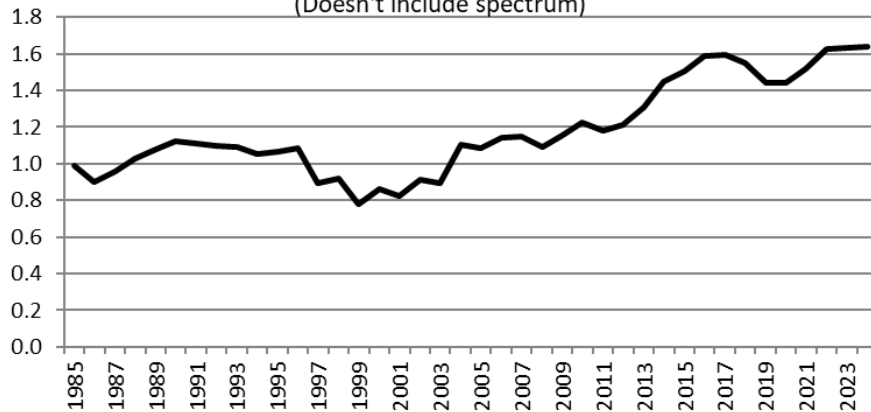
- The financials of a business like cellular must seem very stable to investors
 - Unchanging investment/user (\$500)
 - Unchanging profit/user
- In fact, the dramatic increase in investment per user in the last decade has been masked by an unrealistic depreciation rate and the falling revenue per user has been masked by decreasing SG&A per user

Q3

CTIA Data (until 2025)

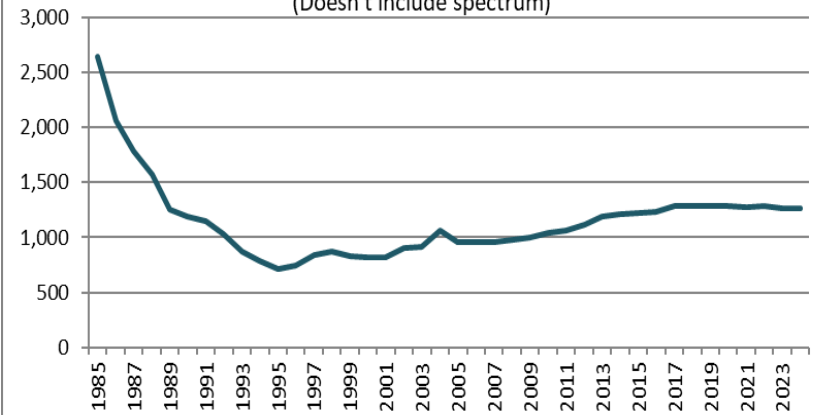
Investment /cell

(Doesn't include spectrum)

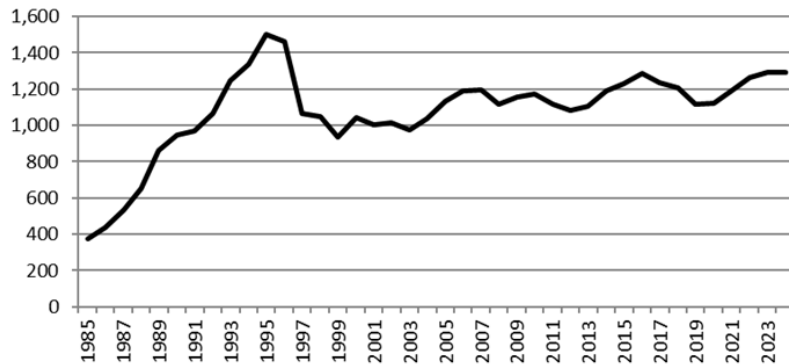


Investment /user

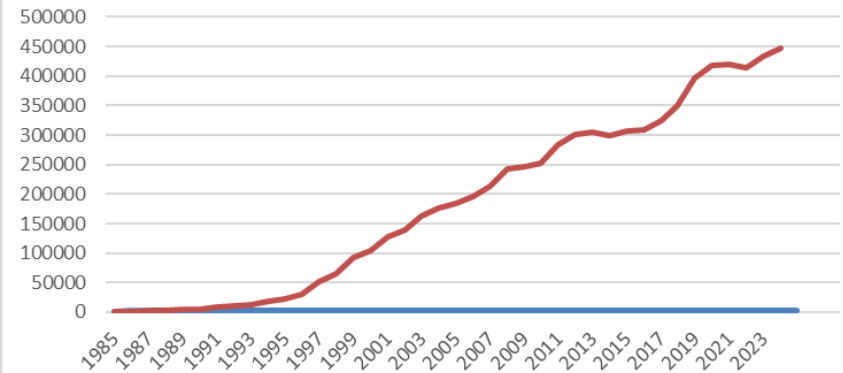
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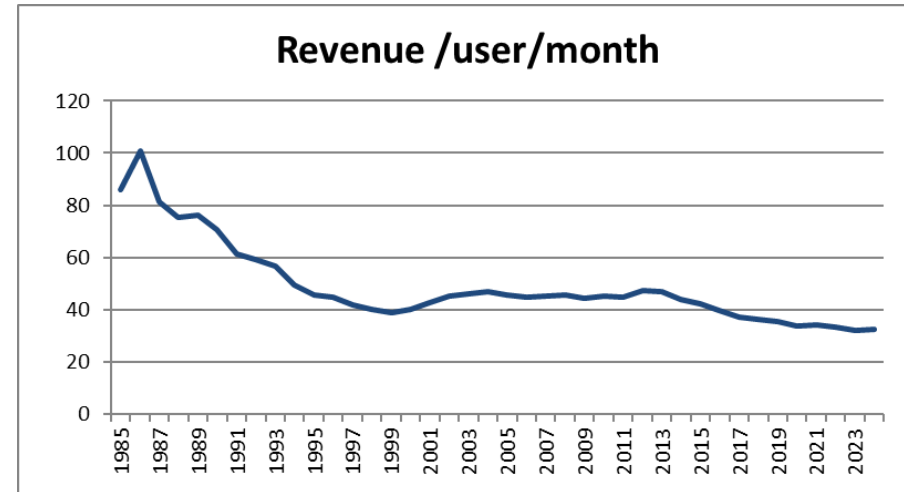
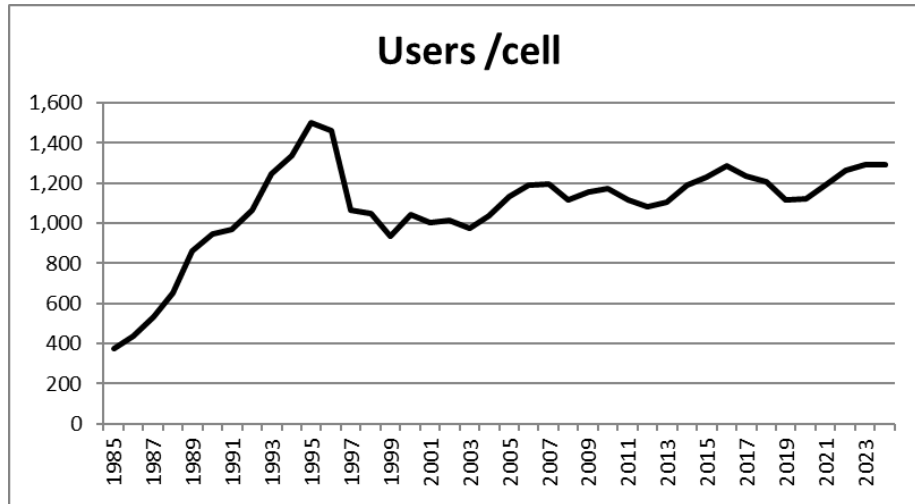
Users /cell



Growth of Cells



CTIA Data Revisited (until 2025)



Saturation of revenue per user

What does the future hold?

- ❑ Since the growth in users has stopped, further reductions in SG&A per user are difficult, so future decreases in revenues will not be offset
- ❑ Perhaps they can hold the line on future revenues, but what about future investments for 5G/6G?
 - Where will the new revenues come from?
 - How long will it take to find and grow those new sources?
 - Will there be new competitors?
 - Will the existing service providers have an advantage?
 - And how do investors and share prices matter in all this?
 - ❑ The next two lectures will explore these issues
 - ❑ They turn out to be more important than we may have realized