The “Beer Game”

• Let’s play a game to introduce some of the concepts of this section!

• Split into groups
The “Beer Game”

• What happened?

• Where do agricultural producers fit into this game?
  – Beginning of the supply chain
  – Significant investment costs
  – Big inventory/price swings
Cash Flow

[Cartoon of a yo-yo sales graph]
Cash Flow
Key Concepts

• Developing a **statement of cash flows**

• How to interpret **cash flow**
  – Am I **solvent**?
  – Are my assets **liquid**?
  – How do I plan for trouble?
  – How can I improve my cash flow?
Why is Cash Flow Important?

• *Cash is the lifeblood of a business*

• Without cash, you can’t pay your debts or make new purchases

• Agriculture is known for extremely inconsistent cash flows
CA Tomato Expenses

Cash Cost Per Acre by Month

Oct  Nov  Dec  Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep

$0.00  $100.00  $200.00  $300.00  $400.00  $500.00  $600.00  $700.00  $800.00  $900.00
Statement of Cash Flows

• Shows how changes in balance sheet accounts and income affect cash available

• Can you pay your bills?

• Income = revenue – expenses
  – Includes sales on credit and depreciation

• Cash flow = changes in bank account
Statement of Cash Flows

• **The Direct Method**
  
  – Cash flows from **operating** activities
    • Sales, interest payments, credit -> cash
    • Day-to-day cash transactions
  
  – Cash flow from **investing** activities
    • Equipment purchases/sales, financial investments
  
  – Cash flows from **financing** activities
    • Changes in long-term debt and equity
    • Equity only a factor if you issue stock
Statement of Cash Flows

<table>
<thead>
<tr>
<th>Cash flows from (used in) operating activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash receipts from customers</td>
</tr>
<tr>
<td>Cash paid to suppliers and employees</td>
</tr>
<tr>
<td>Cash generated from operations (sum)</td>
</tr>
<tr>
<td>Interest paid</td>
</tr>
<tr>
<td>Income taxes paid</td>
</tr>
<tr>
<td>Net cash flows from operating activities</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cash flows from (used in) investing activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proceeds from the sale of equipment</td>
</tr>
<tr>
<td>Dividends received</td>
</tr>
<tr>
<td>Net cash flows from investing activities</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cash flows from (used in) financing activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dividends paid</td>
</tr>
<tr>
<td>Net cash flows used in financing activities</td>
</tr>
<tr>
<td>Net increase in cash and cash equivalents</td>
</tr>
<tr>
<td>Cash and cash equivalents, beginning of year</td>
</tr>
<tr>
<td>Cash and cash equivalents, end of year</td>
</tr>
</tbody>
</table>
Depreciation and Cash Flow

• The amount of **depreciation** you claim directly affects the **taxes** you pay
  — Section 179

• The more **depreciation** you claim now, the fewer taxes you pay today, but you’ll pay more tax later
Discussion

- What are some different ways to show cash flow?
  - Different periods (day, week, month, year)
  - Business vs personal vs both
  - Different operations
Cash Flow Pitfalls

• It’s difficult to track cash flow and even more difficult to predict cash flow

• Winning and losing streaks
  – The curse of randomness
  – Forecasting conservatively
Activity

• What’s your birthday?

• Disaster simulation
The Time Value of Money
Introduction

• It’s impossible to talk about cash flow without talking about the time value of money

• Would you rather have $100 today or in a year?
Introduction

• Why $100 today?

• You want the money **today** (sooner) because
  – Risk
  – Opportunity Cost
  – Inflation
Key Concepts

- Future Value
- Present Value
- Return or Interest Rate
- Time Periods

- Mathematical skills necessary to evaluate projects and loans
Basic Definitions

• **Present Value** (PV)
  – The current value of future cash flows discounted at the appropriate discount rate
  – Value at t=0 on a time line

• **Future Value** (FV)
  – The amount an investment is worth after one or more periods
  – “Later” money on a time line
Basic Definitions

- Interest rate \((r)\)
  - Discount rate
  - Cost of capital
  - Opportunity cost of capital
  - Required return
  - Terminology depends on usage
Future Values: General Formula

\[ FV = PV(1 + r)^t \]

- **FV** = future value
- **PV** = present value
- **r** = period interest rate, expressed as a decimal
- **t** = number of periods

- Future value interest factor = \((1 + r)^t\)

Note: “y^x” key on your calculator
Future Values – Example 1

• Suppose you invest $100 for one year at 10% per year

• What is the future value in one year?
  – **Interest** = 100(.10) = 10
  – Value in one year
    = **Principal** + interest
    = 100 + 10 = 110
  – Future Value (FV)
    = 100(1 + .10) = 110
Future Values – Example 1

Suppose you leave the money in for another year. How much will you have two years from now?

\[ FV = 100(1.10)(1.10) = 100(1.10)^2 = 121.00 \]
Effects of Compounding

• Simple interest
  – Interest earned only on the original principal

• Compound interest
  – Interest earned on principal and on interest received
  – “Interest on interest” – interest earned on reinvestment of previous interest payments
Effects of Compounding

• Consider the previous example
  – FV w/ simple interest
    = 100 + 10 + 10 = 120
  – FV w/ compound interest
    = 100(1.10)^2 = 121.00
  – The extra 1.00 comes from the interest of .10(10) = 1.00 earned on the first interest payment
Investment Growth

Growth of $100 original amount at 10% per year. Blue shaded area represents the portion of the total that results from compounding of interest.
Interest Rates

• https://www.youtube.com/watch?v=GHHe5A
t6OM
Present Values

• The **current value of future cash flows** discounted at the appropriate rate

• Value at $t=0$ on a time line

• Answers the questions:
  – *How much do I have to invest today to have some amount in the future?*
  – *What is the current value of an amount to be received in the future?*
• Present Value = the current value of an amount to be received in the future

• Why is money today worth more than money tomorrow?
  – Opportunity cost
  – Inflation
  – Risk & Uncertainty

Discount Rate = \( f(\text{time, risk}) \)
Important Complication!

• Interest rates are quoted in a variety of ways
  – Compounded yearly, quarterly, monthly, daily, etc.

• *Why does this matter?*
  – More frequent compounding means more compound interest, which means a higher effective interest rate
Interest Rates

• **Effective Annual Rate (EAR)**
  – The interest rate expressed as if it were compounded once per year
  – **Used to compare** two alternative investments with different compounding periods

• **Annual Percentage Rate (APR) “Nominal”**
  – The annual rate **quoted by law**
  – APR = periodic rate \( \times \) number of periods per year
  – Periodic rate = APR / periods per year
Discussion

• How do credit card companies and other lenders trick you?

• Credit Card Contract
Things to Remember

• You ALWAYS need to make sure that the interest rate and the time period match
  – Annual periods ➔ annual rate
  – Monthly periods ➔ monthly rate

• If you have an APR based on monthly compounding, you have to use monthly periods for lump sums or adjust the interest rate accordingly
EAR Formula

\[ \text{EAR} = \left(1 + \frac{\text{APR}}{m}\right)^m - 1 \]

**APR** = the quoted rate

**m** = number of compounds per year
APR Formula

\[
APR = m \left[ (1 + \text{EAR})^{\frac{1}{m}} - 1 \right]
\]

\[M = \text{number of compounding periods per year}\]
Interest Rates

• Which savings accounts should you choose:
  – 5.25% with **daily** compounding
  – 5.30% with **semiannual** compounding

• First account:
  • EAR = \((1 + \frac{.0525}{365})^{365} - 1\) = 5.39%
  • ICONV: NOM=5.25; C/Y=365  EFF=5.3899
  • Excel: =EFFECT(0.525,365)= 5.39%

• Second account:
  • EAR = \((1 + \frac{.053}{2})^2 - 1\) = 5.37%
  • ICONV: NOM=5.3; C/Y=2  EFF=5.3702
  • Excel: =EFFECT(0.53,2) = 5.37%

Food and Resource Economic Department (FRED)

/fred.ifas.ufl

@UF_IFAS_FRED