Buying a Car

Cars: toilets or works of art?
Look cool and be smart at the same time
Financing options

Choosing the car you want/need

- How do you see your car?
  - Just something to be used – like a toilet
  - Utilitarian – takes you from place to place in the most efficient means possible
  - As a work of art that needs to be pampered and lovingly cared for
    - An expensive toy that you want to play with
    - Something that makes you look cool
    - Some of this module may not apply to you

Which is it?
Listen to your head or your heart?

☐ Do your research
  - Consumer Reports has an annual car issue
    - Doesn’t accept money from car manufacturers
    - Rates the cars on many attributes (including repair frequency)
      - Definitely NOT for a “motor head”
  - Car and Driver, Road and Track, Motor Trend
    - Do accept money from car manufacturers
    - Lots of road tests, comparison tests
    - Definitely for a “motor head”

More research

☐ Visit dealerships (I prefer to do this on a Sunday)
☐ Ask around
☐ “Build it” on-line – see option packages
  - Options make the car but can really bump up the cost
  - Optional windshield, brakes, heated seats, sun-roof
☐ Analyze your needs
  - Sports car
  - Basic transportation
  - Status symbol
  - SUV

Avoid valet parking
Narrow it down

- Sports car
  - Miata, Boxster, Mini, Z4, Wrangler
- Basic transportation
  - Civic, Accord, Camry, Neon
- Status symbol
  - BMW 3, Audi A6, Lexus, Acura
- SUV
  - Hummer, Tahoe, Explorer, Pathfinder, Jeep

New or used?

- New car
  - Average new car loses 20% of its value the instant you drive it off the lot
  - Your new $40,000 car is worth $32,000 the next day
  - New cars have less repair problems and come with better warranties than used cars
- "Pre-owned" (aka USED)
  - Obviously cheaper for the same model
  - Won’t decline nearly as much in price
  - More expensive to buy from a dealer but may have less repair problems and a better warranty than buying privately
  - Try to find out why the former owner is selling it
  - Take it to a mechanic before buying – if owner resists, walk away
- How long do you plan to own the car?
  - 1 or 2 years – go used; 3 or more – new if you can afford it

How are you going to pay for it?

- Cash – how realistic is this?
  - Great if you can pay cash
  - Not a great idea to finance an asset that
    - depreciates in value
    - Falls apart before it’s paid off
- Finance it – the rest of us
  - Good way to establish your credit rating
  - Buy it with a loan
  - Lease it
Car loans

- Down payment (what you can afford to pay now)
- Monthly payment (max of 20% of your monthly net income)

Let's assume $4,000 down and $400 per month

- If interest rate = 9%/yr, you can borrow $12,579 with a 3-year loan, $16,074 with a 4-year loan and $19,269 with a 5-year loan
- If interest rate = 5%/yr, $13,346 (3-yr), $17,369 (4-yr) and $21,196 (5-yr)

\[ PV = 400 \left( \frac{1}{(1+0.09/12)^{36}} \right) = 12,579 \]

Computing your loan payment

- Formula will give you the exact same loan amount as the car dealer calculates for you

\[ PV_0 = \frac{PMT}{i} \left( 1 - \left( \frac{1}{1+i} \right)^n \right) \]

- i is interest rate per month (APR/12)
- n = number of months for the loan
- PMT is the monthly payment
- PV is the amount of the loan (amount you borrow from the dealer or the bank)
- Calculator buttons: 9/12=.75=>i 36=>n 400=>PMT solve PV = $12,579

Know 3 – find the 4th

- PV = PMT \left( \frac{1}{(1+i)^n} \right)
- Given PMT, i and n, you can find PV
  - What we just did – max loan possible
- Given PV, i and n, you can find PMT
  - You "need" PV to buy the car; what's it going to cost you each month?
- Given PV, - (PMT) and n, we can find monthly i (multiply i by 12 = APR)
  - What interest rate is the lender charging you?
Use Excel for “what-if” analysis

- Excel is perfect for doing “what-if” analysis for car loans
- Excel has built-in PMT, PV, RATE functions
- In the next two examples, we use the PMT and PV functions and set up two tables
- Easy to see the effect of changing the down payment or the monthly payment

### What-if with Excel

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<th>What if with Excel</th>
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<td>Price of the car</td>
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<tr>
<td>Down payment</td>
<td>10000</td>
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<tr>
<td>Loan amount</td>
<td>40000</td>
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<tr>
<td>APR - Interest Rate</td>
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<tr>
<td>Years</td>
<td>5%</td>
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<tr>
<td>---------</td>
<td>-----</td>
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<td>3</td>
<td>1,199</td>
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<td>4</td>
<td>921</td>
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### What-if with Excel II

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<td>Monthly payment</td>
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<tr>
<td>Amount borrowed</td>
<td></td>
</tr>
<tr>
<td>APR - Interest Rate</td>
<td></td>
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<tr>
<td>Years</td>
<td>5%</td>
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<tr>
<td>---------</td>
<td>-----</td>
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</table>

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Other considerations

- Insurance, gas, tires (don’t skimp on brakes and tires), repairs
- Warranties
  - Avoid extended warranties and service contracts
  - Get it serviced regularly (not at dealer unless under warranty)
  - Not worth it since standard warranties are long enough
- Selling your old car
  - Sell it yourself and get more but it’s a hassle
  - Go to kellybluebook.com (kbb.com) for trade-in and private sale values – depressing
  - Your old car will always be worth more to you than to someone else

How to shop

- If possible visit 3 or 4 dealerships that sell what you want and let them know this
- Buying at the end of the model year could save you big bucks – poorer selection and it’s a year old already when it comes to resale value
- Go near the end of the month – salesmen need to meet quotas
- Window sticker is “suggested retail price” which is meaningless
  - Go to kbb.com to find the dealer’s cost and add 3-4% (<20,000) or 6-7% (>20,000) to get your offering price

Negotiating price

- Get a firm price quote independent of how you will pay for the car
  - Price should not depend on trade-in or means of financing
    - These are separate issues – get the price first
- Dealer may offer choice: rebate vs. lower interest rate
  - $1,000 rebate or a 5% interest rate on a $10,000 4-year loan (normal rate is 10%)
Rebate or lower rate

- 10,000 = PMT_{Dealer} (PVIF_{a, 5/12} \times 4 \times 12)
  - PMT_{Dealer} = 230/month
- 10,000 = PMT_{Bank} (PVIF_{a, 10/12} \times 4 \times 12)
  - PMT_{Bank} = 254/month
- Savings = (254-230) \times 48 = 1,152 and 1,152 > 1,000
  so take the lower rate – ignores TVM
- Savings = (254-230)(PVIF_{a, 10/12} \times 4 \times 12) or
  $946 < 1,000 so take rebate
- Remember, this is $152 or $54 spread over 4 years – who the heck cares!

Leasing vs. buying

- Leasing (About 25% of all new cars)
  - Renting your car for 2 to 5 years – you own nothing
    when lease is up – but (most leases) allow you to
    walk away even if market value < residual value
  - Lower monthly payments - get more car for the
    money
  - Lower down payment
- Buying
  - Higher monthly payments but you own the car at the
    end of the loan
  - Usually cheaper way to go

How leasing works

- Lease payment depends upon:
  - Purchase price of the car
  - Forecasted residual value at the end of lease
  - Financing (interest) rate
  - Term of the lease
- You finance the depreciation over the lease term
  - Depreciation = Purchase price – residual value
- Payment = depreciation + sales tax + interest to
  the car dealer
Lease characteristics

Most leases have a **purchase option** so you can buy the car at lease’s end
- At a fixed price (best)
- At the market price
- At the residual value

Be wary of hidden costs of leasing
- Acquisition fee – setting up the lease
- Disposition fee – dealer prep on car for resale
- Per mile fee if you exceed max allowable mileage
- Early termination fee – applies even if wrecked

Early termination fee

Payment calculators

For help on the lease vs. buy question, visit:
- [www.bankrate.com](http://www.bankrate.com) (calculators)
- [www.financenter.com](http://www.financenter.com) (consumer site)
Lease vs. buy summary

- Buying is cheaper than leasing
  - Own the car at the end of the loan
- For a given car, leasing gives you a lower monthly payment
  - For a given monthly payment, you can get more car by leasing
- Both this is short-sighted – in the end, buying with a loan will save you money

Some of my car experience

- Once paid $4,400 for a new Corvette and rolled it over in a corn field on a snowy Lafayette weekend
- Drove the same Jeep CJ7 from 1978 to 1996
  - Forced to sell with the arrival of my first child
- Bought a new Porsche 911 in 1982 with 60 $550 monthly payments
  - Paid off loan 2 months early (decided to grow up)
- 10 days later traded for another Porsche
  - 60 $780 payments (>$rent) – still drive it 20+ yrs later