Taxes

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BUSI 448: Investments

Where are we?

Last time:

- Economics of asset mgt
- Alphas
- Attribution Analysis
- Market Timing

Today:

- Tax-advantaged Accounts
- Tax-advantaged Securities

Taxation Primer

Tax Brackets

Progressive taxation: income is taxed at higher rates as more is earned

- The first dollar earned is taxed less than the last dollar earned.
- **Marginal** tax rate refers to the tax rate owed on next dollar you earn.

Tax Brackets

2022 Federal Income Tax Brackets and Rates for Single Filers, Married Couples Filing Jointly, and Heads of Households

Tax Rate	For Single Filers	For Married Individuals Filing Joint Returns	For Heads of Households
10%	$0 to $10,275	$0 to $20,550	$0 to $14,650
12%	$10,275 to $41,775	$20,550 to $83,550	$14,650 to $55,900
22%	$41,775 to $89,075	$83,550 to $178,150	$55,900 to $89,050
24%	$89,075 to $170,050	$178,150 to $340,100	$89,050 to $170,050
32%	$170,050 to $215,950	$340,100 to $431,900	$170,050 to $215,950
35%	$215,950 to $539,900	$431,900 to $647,850	$215,950 to $539,900
37%	$539,900 or more	$647,850 or more	$539,900 or more

Deductions shield income from taxation

- Some retirement savings are tax-deductible
- Standard deductions vs. itemized deductions
  - Single filer: $12,950
  - Married filing jointly: $25,900
- Itemized deductions
  - Mortgage interest
  - State and local taxes (SALT)
  - Charitable contributions

General schedule

Gross Income

-Tax-Deductible Savings Contributions

-Other Deductible Items

=Adjusted Gross Income (AGI)

-Standard or Itemized Deduction

=Taxable Income

- Tax is calculated based on taxable income and filing status

Example

- Consider a single investor earning $65,000 per year.
- Assume they take the standard deduction of $12,590.
- Under the 2022 tax rates & brackets, what is the investor's tax bill if they do not have any other deductions?
- What is the investor's tax bill if they have contributed $6,000 to a traditional IRA?

Taxes and investments

- Investments are made in the hopes of generating income or price appreciation.
- The source of the return can impact the taxes owed.
- Interest income is taxed at ordinary income rates.
- Capital gains are taxed at different capital gains rates.
  - Is holding period short- or long-term?
  - Limits on deductibility of capital losses
  - Gain is calculated relative to your **cost basis**

2022 LT capital gains rates

Long-term capital gains tax rates for the 2022 tax year

FILING STATUS	0% RATE	15% RATE	20% RATE
Single	Up to $41,675	$41,676 – $459,750	Over $459,750
Married filing jointly	Up to $83,350	$83,351 – $517,200	Over $517,200
Married filing separately	Up to $41,675	$41,676 – $258,600	Over $258,600
Head of household	Up to $55,800	$55,801 – $488,500	Over $488,500

Tax-advantaged Accounts

Our benchmark

- We will explore how account taxation can affect the future value of investments.
- Our benchmark will be an investment with no tax advantages in which any gains are taxed immediately at ordinary income rates.

Some terminology and assumptions

We will assume 2 sets of tax rates:

1. Ordinary income rates τ_{oi}
2. Capital gains rates τ_{cg}.

- We will assume constant tax rates from time $t = 0$ to time $t = T - 1$ before changing to new rates at time T
  - individual's tax brackets may change in somewhat predictable ways
- 4 possible tax rates: $\tau_{oi,0}$, $\tau_{oi,T}$, $\tau_{cg,0}$, $\tau_{cg,T}$.

Tax Treatment #1

- No tax benefits
- Gains are taxed immediately at ordinary income rates

$$FV_1 = \Pi_{t=1}^{T} \left(1 + r_t (1 - \tau_{oi,t})\right) .$$

- Examples: bank accounts, money market accounts, and non-tax-advantaged bonds

Tax treatment #2

- Non-deductible IRA
- Contributions are in after-tax dollars
- Taxation on gains is deferred until withdrawal at which time they are taxed as *ordinary income*

$$
\begin{aligned}
FV_2 &= \Pi_{t=1}^{T}(1+r_t) - \tau_{oi,T}\left[\Pi_{t=1}^{T}(1+r_t) - 1\right] \\
&= (1-\tau_{oi,T})\Pi_{t=1}^{T}(1+r_t) + \tau_{oi,T}
\end{aligned}
$$

Tax treatment #3

- Non-dividend stock
- Investment made with after-tax dollars
- Taxation on gains is deferred until sale at which time they are taxed as *capital gains*

$$
\begin{aligned}
FV_3 &= \Pi_{t=1}^{T}(1+r_t) - \tau_{cg,T}\left[\Pi_{t=1}^{T}(1+r_t) - 1\right] \\
&= (1-\tau_{cg,T})\Pi_{t=1}^{T}(1+r_t) + \tau_{cg,T}
\end{aligned}
$$

Tax treatment #4

- Roth IRA or a 529 college savings plan
- Contributions are made using after-tax dollars and earnings are tax-exempt

A dollar of after-tax investment turns into

$$FV_4 = \Pi_{t=1}^{T} \left(1 + r_t\right) \ .$$

Tax treatment #5

- Traditional IRA or 401(k)/403(b) retirement plan.
- Contributions are made using pre-tax dollars (that is, contributions are tax deductible)
- Earnings are tax-deferred $\rightarrow$ withdrawals taxed at ordinary income rates
  - withdrawals of both initial investment and gains

Tax treatment #5 (cont'd)

- Because the contribution is tax deductible, you save $\tau_{oi,0}$ of taxes that would have otherwise been paid.
- The after-tax cost upon contribution is thus $1 - \tau_{oi,0}$.
- The investment account grows to a time T value of $\Pi_{t=1}^{T}\left(1 + r_t\right)$ which is all taxed at withdrawal generating an after-tax time T value of $\left(1 - \tau_{oi,T}\right)\Pi_{t=1}^{T}\left(1 + r_t\right)$.

Tax treatment #5 (cont'd)

After-tax return (after-tax FV/after-tax contribution):

$$FV_5 = \frac{(1 - \tau_{oi,T})\Pi_{t=1}^{T}(1 + r_t)}{1 - \tau_{oi,0}}$$

Traditional vs. Roth IRAs

If $\tau_{oi,0} = \tau_{oi,T}$, traditional and Roth IRAs are equivalent on an after-tax basis.

- Roth IRAs are preferred if an investor's tax rate is expected to be higher at withdrawal.
  - Better to pay taxes at low rate today
- Traditional IRAs are preferred if an investor's tax rate is expected to be lower at withdrawl.
  - Better to shield taxes at high rate today

Asset location vs. asset allocation

Asset allocation: the choice of how much of each asset to hold

Asset location: the choice of where to locate different asset classes if different tax-advantaged accounts are available.

- This is a challenging problem!
- Investors with different expected tax rates may come to different allocation and location decisions.
- Rule of thumb: Hold more heavily taxed assets (corporate and Treasury bonds) in tax-deferred accounts and lightly-taxed assets (stocks) in taxable accounts

Tax-advantaged Securities

Mortgages

- For households, mortgage interest is tax-deductible, up to some limits.
  - Deduction reduces taxable income
  - Tax savings is:

$$\tau_{\text{marginal}} \cdot \text{Deductible Mortgage Interest}$$

2022 tax year

- Mortgage interest expense on principal up to $750,000 is tax deductible.
- Taxpayer must itemize deductions rather than take the standard deduction
  - Single filer: $12,950
  - Married filing jointly: $25,900

Example

- The annual interest expense for a $500,000 mortgage with a 5% interest rate is $24,832.47 in the first year.
- For an investor with a 24% marginal tax rate and a $12,950 standard deduction, what is the incremental value of itemizing deductions?

Municipal Bonds

- Municipal bonds: issued by states and municipalities
- In an investor's home state, muni coupons and original issue discount (OID) are exempt from state income tax
  - US treasury bonds are also exempt from state and local taxes
- Some munis qualify as exempt from federal income tax
- Munis are tax-exempt only at issuance

Muni yields

- Munis are primarily held by individuals (in the issuing state)
- These investors accept a lower yield than they would for a comparable taxable bond.

Other tax topics

ETFs versus mutual funds

- ETFs are generally more tax-efficient than mutual funds.
- Flows in and out of mutual funds may generate sales of underlying assets in the mutual fund.
  - Resulting capital gains are passed on to the fund investor
- ETF investors thus are able to substantially defer capital gains taxation

Roth IRAs and skewed returns

- Withdrawals from Roth IRAs do not incur any tax.
- This tax treatment can be extraordinarily valuable for highly skewed assets.
- A famous example is Peter Thiel (PayPal founder and venture capitalist)
- Thiel's Roth IRA is over $5 billion!
- Congress will likely cap the maximum balance that will be tax-free
- Paying attention to taxes pays…sometimes big!

For next time: Review