Capital Income Taxation and Retirement Savings Vehicles

Lecture Outline

- Tax Basics
- Capital income taxation
  - Interest, dividends, short-term and long-term capital gains
  - Inflation and the after-tax real interest rate
- Tax-favored saving for retirement
  - 401(k) accounts vs IRAs
  - Ordinary vs Roth IRAs
  - Withdrawal penalties
- Age and risk
  - Arguments for taking more risk when young, less when old
  - Target date funds

Taxes

Introduction to Taxation

- Any tax has a **base** and a **rate**. The amount you pay is the base times the rate.
- Many different bases are possible:
  - Wages and salaries (Social Security and Medicare taxes)
  - Total income (income tax)
  - Value of goods purchased (sales tax)
  - Value of real estate owned (real estate property tax)
  - Value of autos owned (personal property or excise tax)
  - Total wealth at death (estate tax)
  - Amount earned on an investment (capital gains or dividends tax)
- Rates can be flat (a single number) or progressive (a low rate for low base values, higher rates for higher base values).
- Taxes are levied by the US federal government, but also by state and local governments.

Federal SS, Medicare, and Income Tax

- Social Security (SS) and Medicare taxes are levied at flat rates which are divided equally by employer and employee
  - 6.2% each for SS up to a $142,500 ceiling
  - 1.45% each for Medicare with no ceiling.
- Employee contributions are **withheld** by employers.
  - No further calculations, payments, or refunds take place.
- Federal income taxes are paid annually on the basis of a calculation due April 15 each year for the previous year.
  - But employers withhold income tax payments through the year.
  - So most employees get a **refund** after filing their tax returns in April.

W-2 Form: A Summary of Withholding

a Employee's social security number

OMB No. 1545-0008

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Visit the IRS website at www.irs.gov/efile

b Employer identification number (EIN): 37 - 19876541	1 Wages, tips, other compensation: $48,212.78
	2 Federal income tax withheld: $5,589.93
c Employer's name, address, and ZIP code: Information Data, Inc. 9834 Collins Blvd. Benton, NJ 08734	3 Social security wages: $54,212.78
	4 Social security tax withheld: $3,794.84
	5 Medicare wages and tips: $54,212.78
	6 Medicare tax withheld: $1,264.94
	7 Social security tips
	8 Allocated tips
d Control number: 123-45-6789	9
	10 Dependent care benefits
e Employee's first name and initial / Last name / Suff.: Barbara Victor 124 Harper Lane Parmont, NJ 07819	11 Nonqualified plans
	12a See instructions for box 12 — Code D: $5,000
	13 Statutory employee [ ] / Retirement plan [X] / Third-party sick pay [ ]
	12b Code AA: $2,000
	14 Other
	12c Code DD: $4,125
f Employee's address and ZIP code	12d

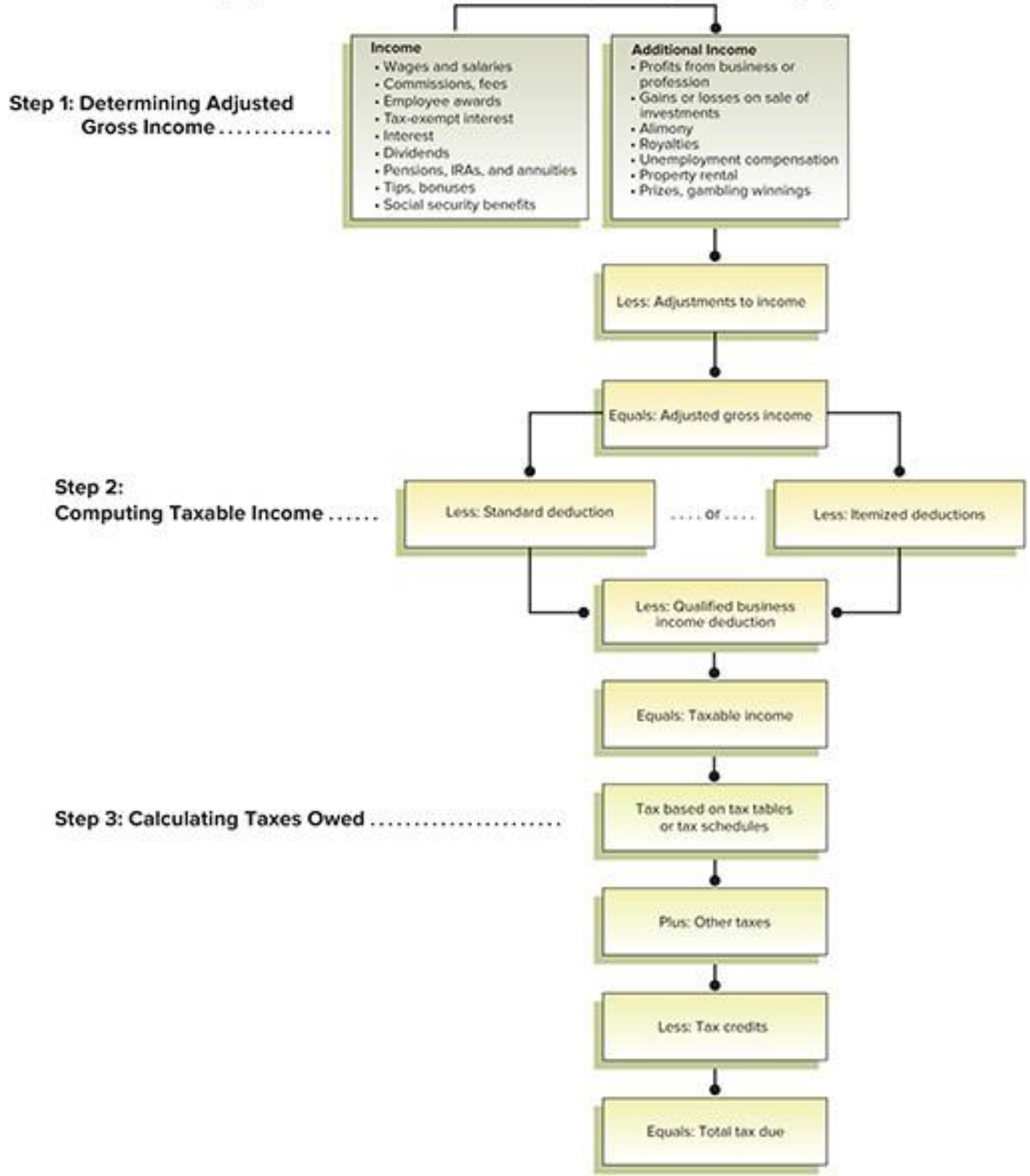
15 State	Employer's state ID number	16 State wages, tips, etc.	17 State income tax	18 Local wages, tips, etc.	19 Local income tax	20 Locality name
	37 - 19876541	$48,212.78	$2,592.72			

Form **W-2** **Wage and Tax Statement**

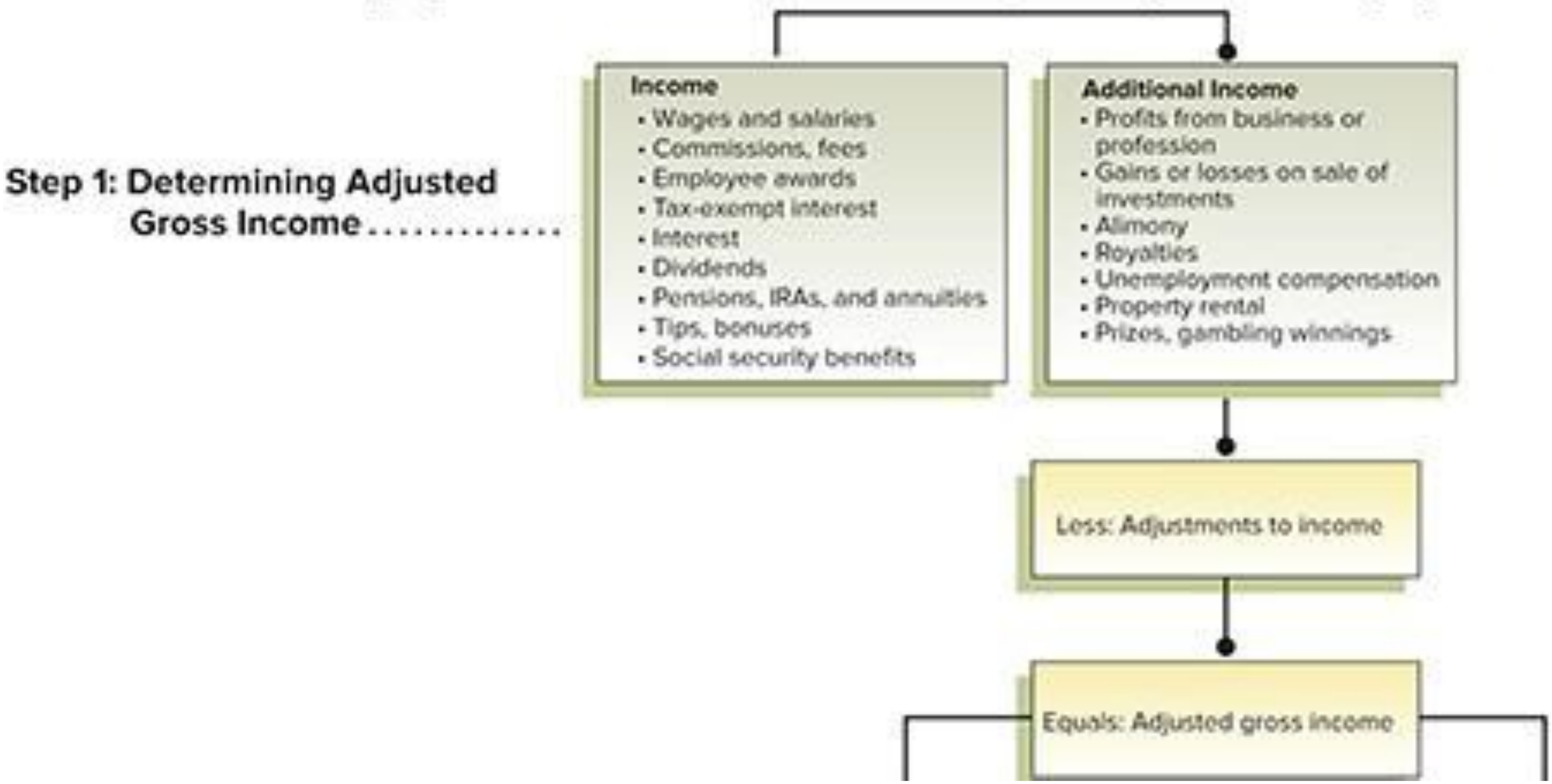
Department of the Treasury—Internal Revenue Service

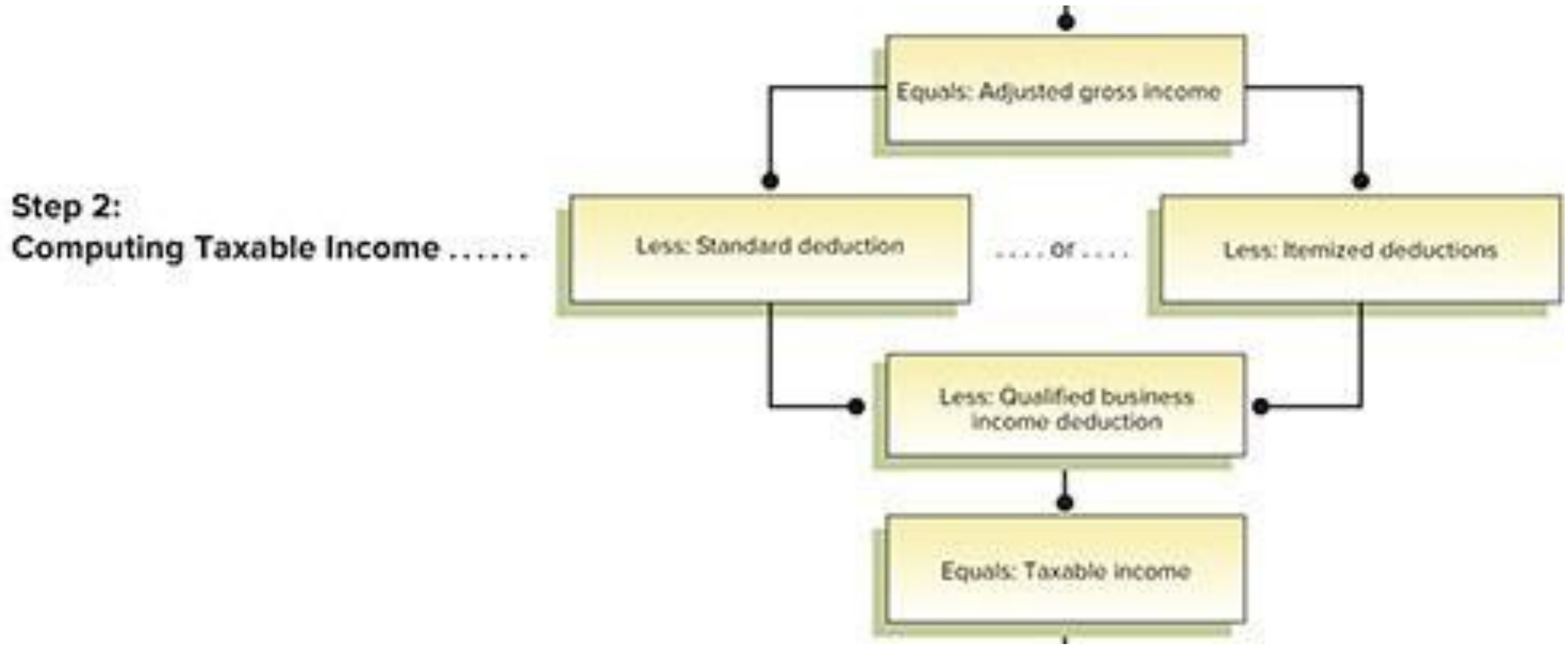
Copy B—To Be Filed With Employee's FEDERAL Tax Return.
This information is being furnished to the Internal Revenue Service.

Source: Kapoor et al *Personal Finance*, Exhibit 4-3, W-2 Form



Source:
Kapoor et al *Personal Finance*, Exhibit 4-1, Computing taxable income and your tax liability


Step 1: Determining Adjusted Gross Income
Income
• Wages and salaries
• Commissions, fees
• Employee awards
• Tax-exempt interest
• Interest
• Dividends
• Pensions, IRAs, and annuities
• Tips, bonuses
• Social security benefits
Additional Income
• Profits from business or profession
• Gains or losses on sale of investments
• Alimony
• Royalties
• Unemployment compensation
• Property rental
• Prizes, gambling winnings
Less: Adjustments to income
Equals: Adjusted gross income



- Standard deduction: $14,600 for single filers, $29,200 for joint filers, and $21,900 for heads of household.
- Itemized deductions: add up medical and dental expenses in excess of 10% of AGI, state and local taxes, certain interest payments, charitable contributions, casualty and theft losses in excess of 10% of AGI, and moving expenses.

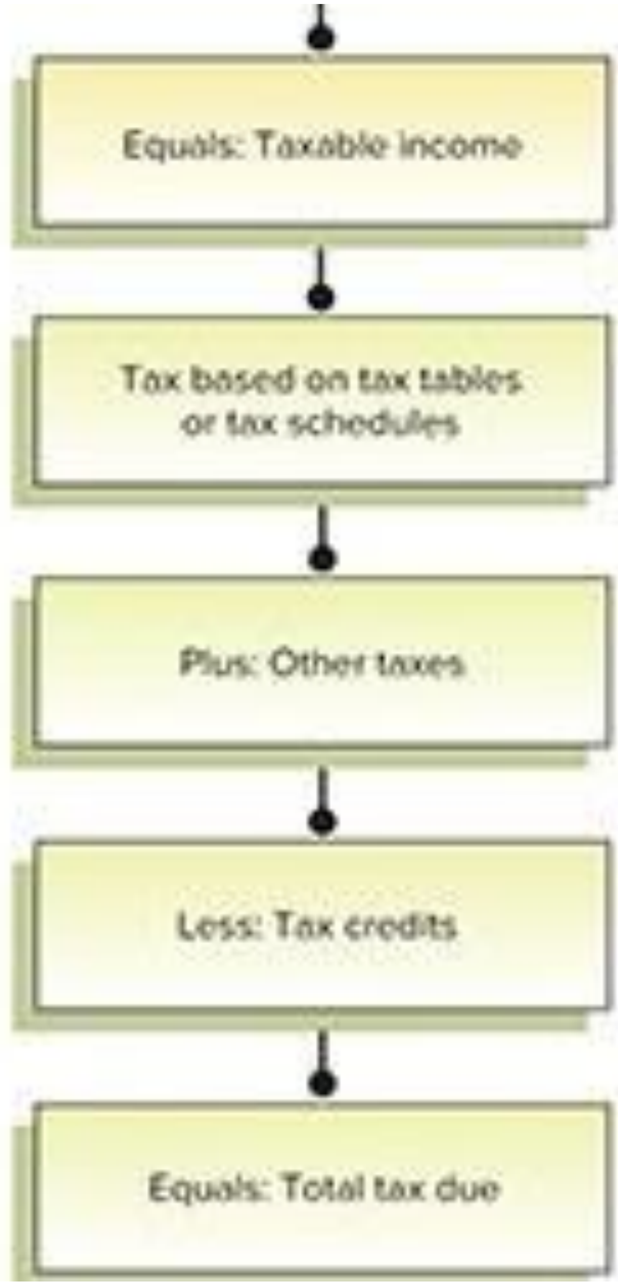
Step 3: Calculating Taxes Owed

2024 Federal Income Tax Brackets and Rates for Single Filers, Married Couples Filing Jointly, and Heads of Households

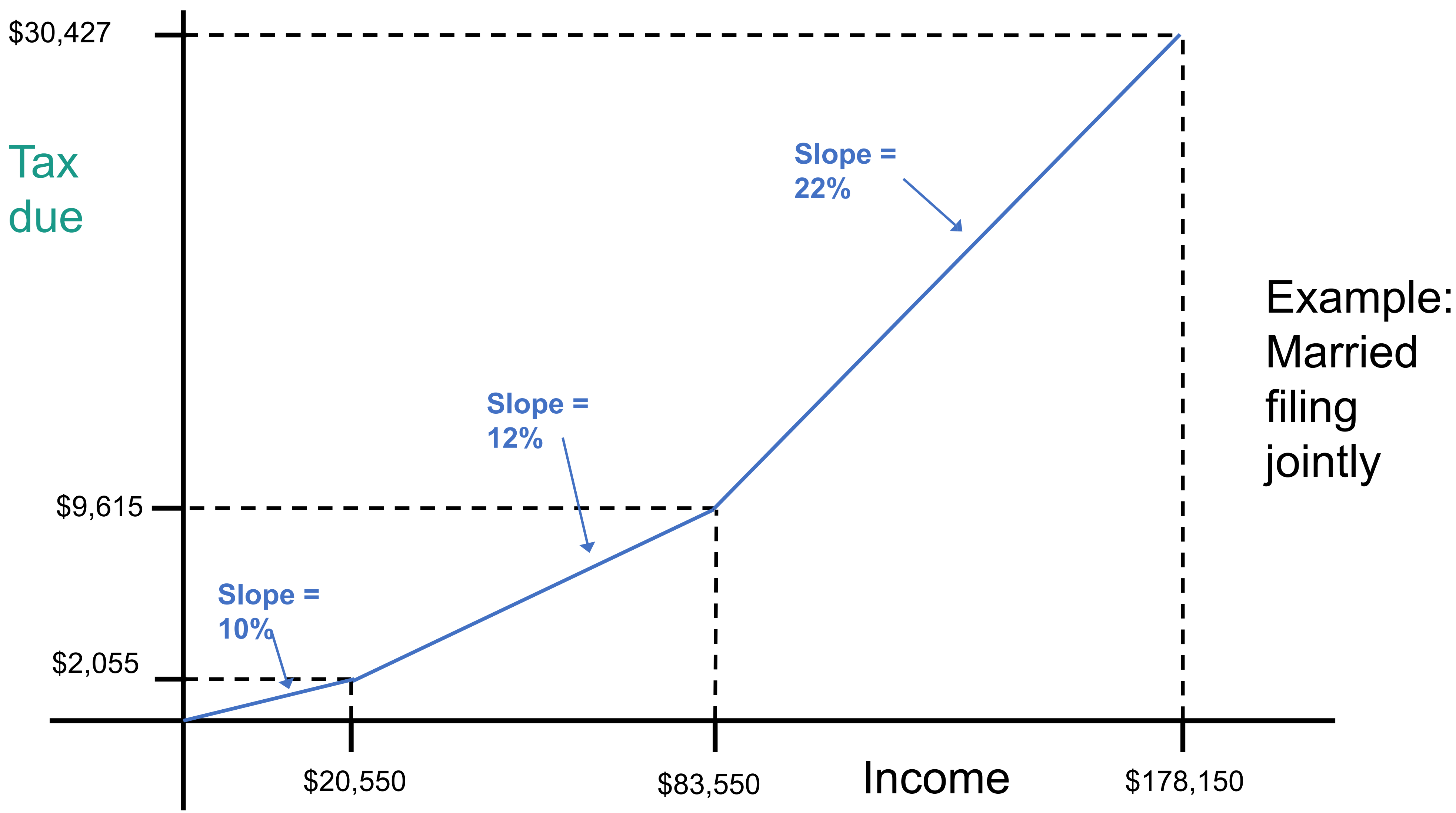
CSV EXCEL PDF PRINT

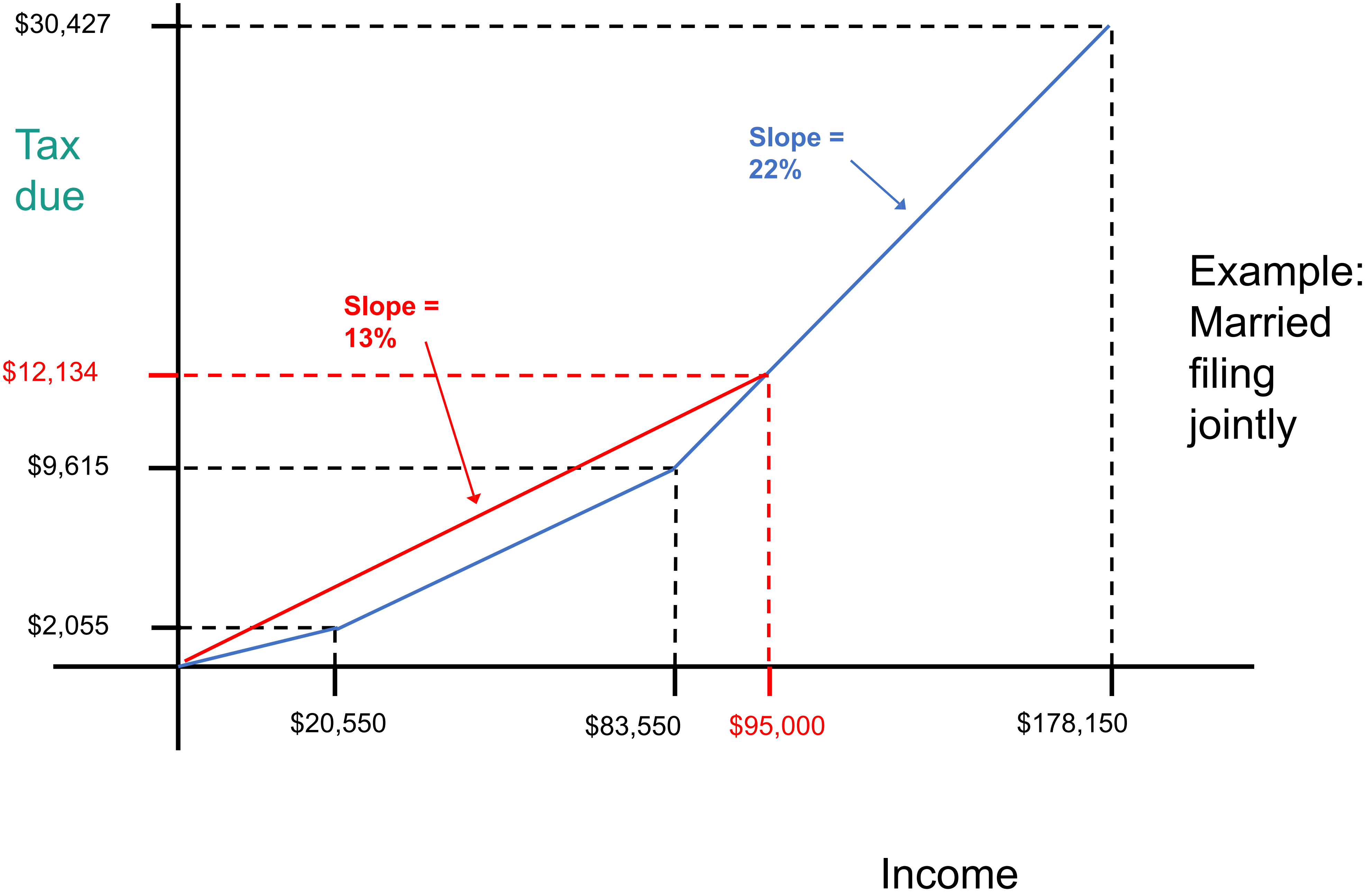
Tax Rate	For Single Filers	For Married Individuals Filing Joint Returns	For Heads of Households
10%	$0 to $11,600	$0 to $23,200	$0 to $16,550
12%	$11,600 to $47,150	$23,200 to $94,300	$16,550 to $63,100
22%	$47,150 to $100,525	$94,300 to $201,050	$63,100 to $100,500
24%	$100,525 to $191,950	$201,050 to $383,900	$100,500 to $191,950
32%	$191,950 to $243,725	$383,900 to $487,450	$191,950 to $243,700
35%	$243,725 to $609,350	$487,450 to $731,200	$243,700 to $609,350
37%	$609,350 or more	$731,200 or more	$609,350 or more

Source: Internal Revenue Service, "Revenue Procedure 2023-34."



https://taxfoundation.org/publications/federal-tax-rates-and-tax-brackets/

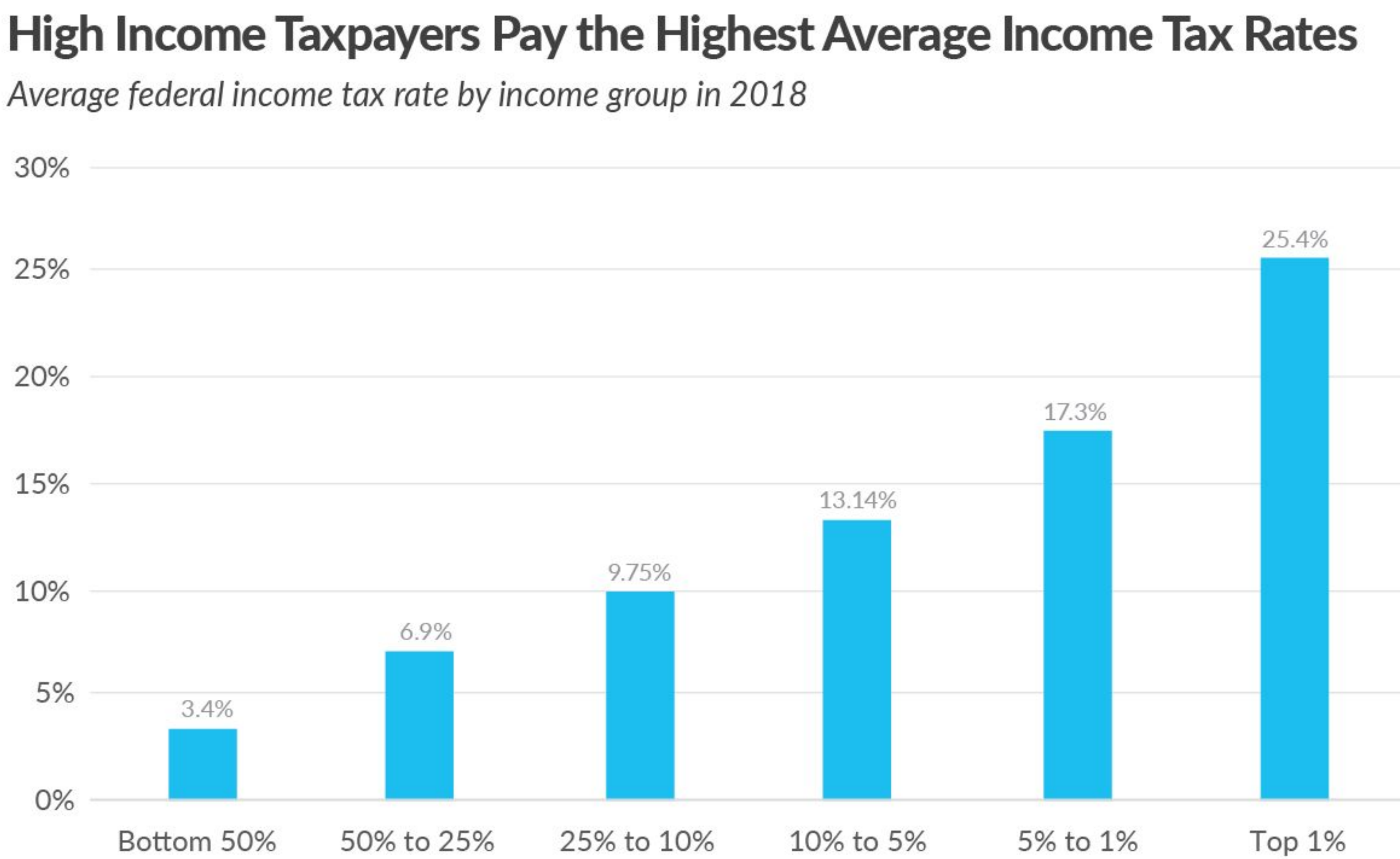

$30,427
Tax due
Slope = 22%
Example: Married filing jointly
Slope = 12%
$9,615
Slope = 10%
$2,055
$20,550
$83,550
Income
$178,150



$30,427
Tax due
Slope = 22%
Example: Married filing jointly
Slope = 13%
$12,134
$9,615
$2,055
$20,550
$83,550
$95,000
$178,150
Income

Average and Marginal Tax Rates

- The Federal income tax system is **progressive**, meaning that the tax rate on additional income increases as income increases.
- The **marginal tax rate** is the share of an additional dollar of income that must be paid in tax.
- The **average tax rate** is the total tax paid divided by total income.
- The marginal tax rate rises to 37% for the highest-income taxpayers.
- The average tax rate also rises with income, but is always below the marginal tax rate.
- The concepts of average and marginal are important in economics



Source: IRS, *Statistics of Income*, Individual Income Rates and Tax Shares.

TAX FOUNDATION @TaxFoundation

https://taxfoundation.org/federal-income-tax-data-2021/

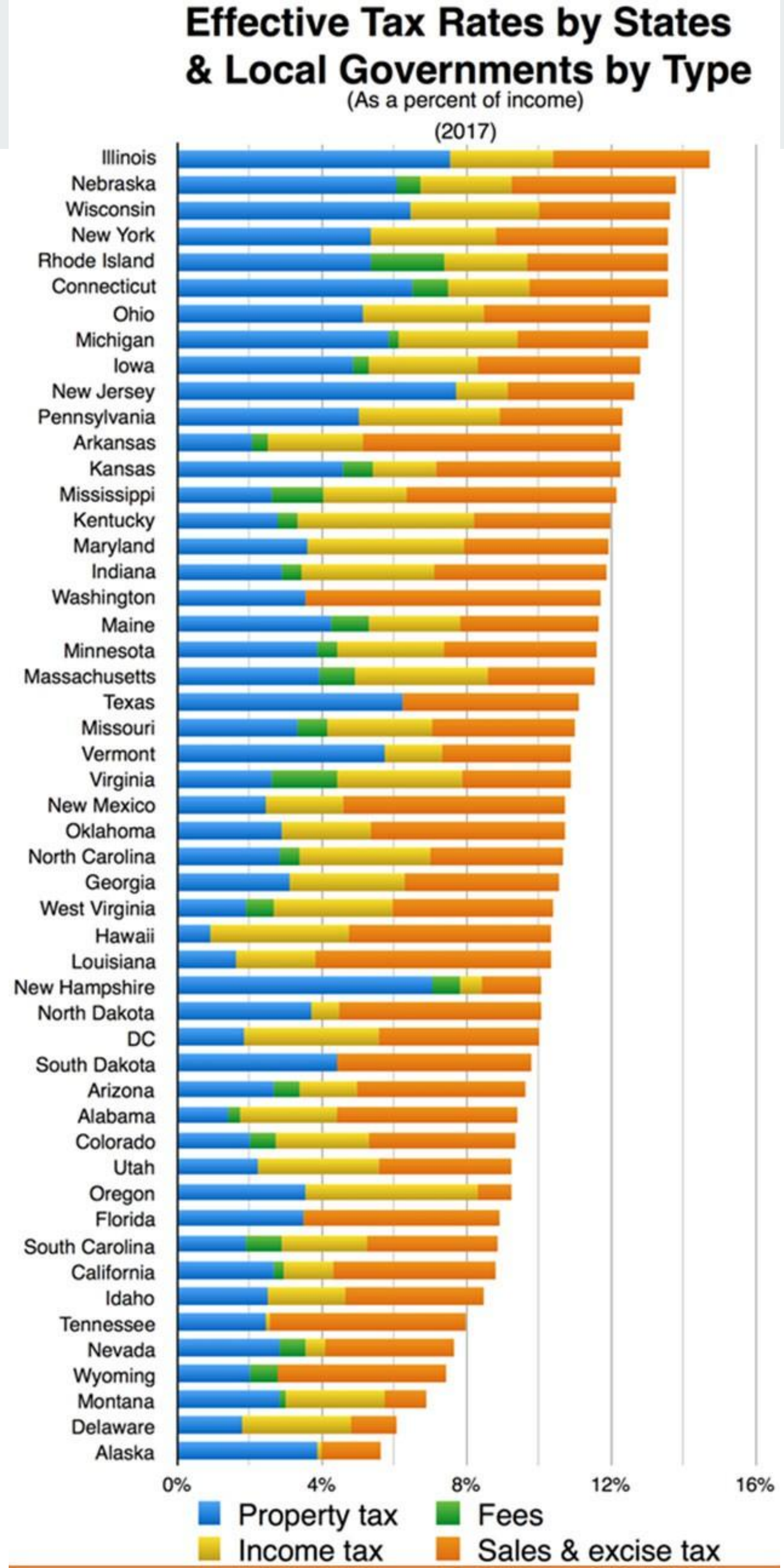
More Income Tax Wrinkles

- Tax credits directly offset taxes due and can even lead to a negative tax (check from the government).
  - A tax credit is a dollar-for-dollar amount taxpayers claim on their tax return to reduce the income tax they owe.
  - Can be refundable or non-refundable
  - Earned income credit (EIC) for low-income working parents is particularly important.
  - Other credits assist and encourage adoption, college education, childcare, electric vehicle purchases, elderly and disabled people, etc.
- Tax credits reduce taxes due, while tax deductions reduce taxable income
- Taxation of income from financial assets will be discussed next…

https://en.wikipedia.org/wiki/State_income_tax

State and Local Taxes

- State and local governments raise money through sales taxes and property taxes.
- But most states also have an income tax.
- The tax burden varies widely across states in both the composition and the total amount.
- There is also local variation within states (e.g. NYC local income tax at a 3-4% rate).



Capital Income Taxation

Taxation of Corporations and Capital Income

- Corporations pay corporate income tax
  - 21% at federal level + state corporate income tax (NJ = 6.5-9%)
- Individuals pay income tax on their capital income
  - 0-20% at federal level on capital gains + state (NJ = up to 10.75%)
- How should we think about these taxes?
- Two leading perspectives emphasize distribution and efficiency, respectively.
- The system we actually have is a messy compromise between these perspectives.

Distribution vs Efficiency

- The distribution perspective:
  - Corporations and people receiving capital income are wealthy, and should pay taxes to reduce inequality.
- The efficiency perspective:
  1. Corporate income is taxed twice, once at the corporate level and again when paid to the personal owners of the corporation. This creates an incentive to restructure corporations as partnerships or “S corps” which are taxed only at the personal level.
  2. Personal income is taxed more heavily when it is saved than when it is consumed. This creates a disincentive to saving.

Corporate and Capital Income Taxes in 2024

- The Tax Cuts and Jobs Act (2017) reduced the corporate income tax rate to 21% and eliminated some loopholes.
- The TCJA also created the current capital income tax system.
- **Interest** is taxable at the ordinary income tax rate.
  - Except when paid by state and local governments (**municipal bonds**), in which case the interest is tax-exempt.
- **Dividends** are taxed at a lower progressive rate.
  - 0% for low-income taxpayers (up to $44,625 income for a single person), 15% for most taxpayers ($44,626-$492,300 income), and 20% for the wealthy (above $492,300 income).

Capital Gains Taxes in 2024

- **Short-term capital gains** (on assets held for less than one year) are taxable at the ordinary income tax rate.
- **Long-term capital gains** are taxable at the dividend tax rate.
- Capital gains taxes are paid only when the gains are **realized** (that is, when the asset is sold).
- **Capital losses** can be used to offset gains and reduce your tax bill.
- If you die while holding an asset, the **basis** (the price from which capital gains are calculated) is reset to the value at your death, wiping out all accrued capital gains, before the asset is passed on to your heirs.

The Logic of This Messy System

- The tax exemption of municipal bonds was originally motivated by a concern that it would be unconstitutional for the federal government to tax the borrowing power of states and local governments.
- The more favorable tax treatment of dividends, relative to interest, offsets the fact that interest, but not dividends, is tax deductible to corporations.
- The unfavorable treatment of short-term capital gains reflects a desire to discourage short-term speculation.
- The equal taxation of dividends and long-term capital gains reflects the fact that corporations can repurchase shares and create capital gains for shareholders as an alternative to paying dividends.

Implications for Taxable Investors

- If you are an individual investor paying capital income taxes, there are some important implications of the system.

1. If you are in a high tax bracket, municipal bonds are appealing because the interest they pay is not taxable.
2. If you hold an asset with capital gains, try to hold it for more than one year so that the capital gains are long-term and taxed at a lower rate.
3. You should try to defer realizing capital gains, especially late in life if you hope to make a bequest and there is a realistic possibility of holding assets until your death.
4. If you do realize capital gains, you should also realize any capital losses you have, as an offset to reduce your tax bill.

And One More Implication

- There is also an important implication for taxable individuals receiving income.

5. If you can find a way to convert ordinary income to capital gains, you should do so.
    - It’s even advantageous to convert dividends to capital gains, despite the fact that they are taxed at the same rate, because dividends are taxed when they are paid while capital gains are only taxed when they are realized.
    - Unsurprisingly, clever people have found ways to do this. For example, private equity and hedge fund managers are often paid in the form of **carried interest**, a share of profits from the funds they manage – which is taxed as capital gains even though it is compensation for work the managers do.

Capital Income Taxation and Saving (1)

- Suppose you pay income tax at rate τ.
- When you earn Y from working, you pay tax τY and your disposable income is $Y_D = (1 - \tau)Y$.
  - If you consume all of your disposable income, this is all the tax you pay.

Capital Income Taxation and Saving (2)

- Now suppose you save a fraction S of your income, which gives you $\boxed{SY}(1+i)$ next year. $SY + \underbrace{SYi}$
- The interest SYi is capital income taxed at rate τ, so you pay tax τSYi next year.

  total tax $= \tau Y + \tau SYi$
- Discounting this to the present we get total tax paid of

PV of taxes $=$
$$\boxed{\underbrace{\tau Y}_{\text{PV if all consumed, no saving}} + \boxed{\frac{\tau SYi}{1+i}}} = \tau Y\left[1 + \frac{Si}{1+i}\right].$$

  - The more you save, the greater the present value of the tax you pay.
  - This discourages saving.

Inflation and the After-Tax Real Interest Rate (1)

- The calculations on the previous slide used the nominal interest rate i, because the tax system defines nominal interest as taxable income.
- When there is inflation, part of nominal interest is just compensation for inflation so the taxation of interest is more serious.
- The real interest rate without taxation is $r = i - \pi$, where π is inflation.

Inflation and the After-Tax Real Interest Rate (2)

- The real interest rate without taxation is $r = i - \pi$, where π is inflation.
- With taxation, the after-tax real interest rate is

$$r_{TAX} = i(1 - \tau) - \pi = r - \tau i = r(1 - \tau) - \tau \pi.$$

  - The discouraging effect of capital income taxation on saving is much stronger when inflation is high.
  - This is one of the reasons why high US inflation in the 1970s and 1980s was so harmful.
  - Example: 1978 had 8.0% Treasury bill rate and 7.6% inflation rate. Real interest rate was 0.4% at $\tau = 0$, -2.4% at $\tau = 0.35$.

Tax-Favored Retirement Saving

Tax-Favored Retirement Accounts

- Today's US retirement system relies heavily on tax-favored retirement accounts that encourage people to save for their own retirement.
- This system developed in the late 1970s and 1980s because:
  - Companies were increasingly reluctant to offer traditional DB pension plans given strict regulation and increasing lifespans.
  - Traditional DB plans worked best for people who worked for a single company their whole life, and this career pattern was becoming less common.
  - Capital income taxation, particularly in a high-inflation environment, made it difficult to save for retirement.

DC's ≈ 401k

Tax-Favored Retirement Accounts

- Tax-favored retirement accounts come in different varieties.
- **Individual retirement accounts** (IRAs) are set up by individuals.
  - Contribution limit of $6,500 per year ($7, 500 if you're over 50).
- **401(k)** accounts are offered and managed by private-sector employers.
  - Higher contribution limit of $22,500 per year ($30,000 if you're over 50).
  - Employers decide the investment choices that employees can make.
  - Employers may make matching contributions to the plan, up to a limit.
- Both types of accounts can be either:
  - **Traditional**: pay no taxes on money you contribute, but pay taxes later when you withdraw money.
  - **Roth**: pay taxes now on contributions, but no taxes later on withdrawals.

Tax-Favored Accounts in All Flavors

- Self-employed people can use a SEP-IRA or Keogh account to increase the contribution limits relative to an IRA.
  - SEP-IRA is simple to set up, Keogh is much more complex but has some additional features that may appeal to high-income individuals.
- Nonprofit employers offer 403(b) and government employers offer 457 accounts which are the equivalent of 401(k) accounts.
- You can save for a child's K-12 education expenses using a Coverdell Education Savings Account (ESA) and higher education expenses using an ESA or a 529 account.
- ABLE accounts are Roth savings accounts for people with disabilities and their families to save for future support needs.

Understanding the Tax Savings

- To understand the tax benefits of an IRA or 401(k), let's work through a simple example.
- Assume that you pay tax at a marginal rate of 35% on all income.
  - So we will ignore the distinction between ordinary income, dividend, and capital gains tax rates discussed earlier.
- Assume that you earn a 10% return on your investments.
  - Presumably you're taking risk to do this, but we'll ignore uncertainty here.
- Suppose that you save $100 of your after-tax income today, planning to consume it in two periods.
  - That corresponds to $153.85 of pre-tax income since you pay 35% x $153.85 = $53.85 in taxes today and are left with $100 to invest.

Saving with No Tax Advantage

- If you are taxed on capital income as it accrues, then after one period you have $10 in capital income on which you pay tax of $3.50. $\tau(10) = .35(10)$
- You are left with $100 + $6.50 = $106.50 to reinvest. After one more period you have $10.65 in capital income on which you pay tax of $3.73.
- You are left with $113.42 to consume the second period.
- And the present value of taxes paid, discounting back to the starting point, is $53.85 + $3.50/1.1 + $3.73/(1.1²) = $60.11.

Saving with Deferred Capital Income Tax

- If you are taxed on capital income only after two periods (as would be the case if this is capital gains tax paid only when gains are realized), then after one period you have $10 in capital income but pay no tax.
- You are left with $110 to reinvest. After one more period you have $121 of which $21 is capital income on which you pay tax of $7.35. $= \tau \cdot 21 = .35(21)$
- You are left with $113.65 to consume the second period.
- And the present value of taxes paid, discounting back to the starting point, is $53.85 + $7.35/(1.1²) = $59.92.
- That's a little better than before… but the tax saving is small.

Saving with a Traditional Account

- Now assume that you save in a traditional IRA or 401(k) account. You are not taxed on income you save, so you can save your full \$153.85 of pretax income.
- You are also not taxed on capital income while you save, so after two periods you have $\$153.85 \times 1.1^2 = \$186.16$.
- You withdraw the money and pay tax of $35\% \times \$186.16 = \$65.16$. You are left with $\$121 = 100 \times 1.1^2$ to consume.
- The present value of taxes paid is $\$65.16/(1.1^2) = \$53.85$.
  - This is exactly what you would have paid in taxes if you had saved nothing.
  - The tax penalty for saving has been eliminated!

Saving with a Roth Account

- Now assume that you save in a Roth account. You are taxed on income you save, so you pay $53.85 in taxes and save $100.
- You are not taxed on capital income while you save, so after two periods you have $\$100 \times 1.1^2 = \$121$.
- You withdraw the money and pay no tax so you consume $121.
- The present value of taxes paid is $53.85 paid at the beginning.
  - This is exactly the same as the traditional account, and your taxes are the same as if you had saved nothing.
  - Again, the tax penalty for saving has been eliminated.

Withdrawal Rules (1)

- Since tax-favored accounts are intended to encourage saving for retirement specifically, there are rules about withdrawals.
- For a traditional account,
  - You can withdraw your money free of penalties after age 59 ½.
  - You **must** start to make withdrawals (**required minimum distributions** or RMDs) after age 72.
  - If you want to withdraw money before age 59 ½, you pay a 10% penalty except in certain mitigating circumstances: first-time home purchase, higher education expenses (IRA only), out-of-pocket medical expenses exceeding 10% of your income, required alimony and child support, or 2020 COVID pandemic.
  - Whether or not you pay a penalty, you always pay federal and state income tax on your withdrawals.

Withdrawal Rules (2)

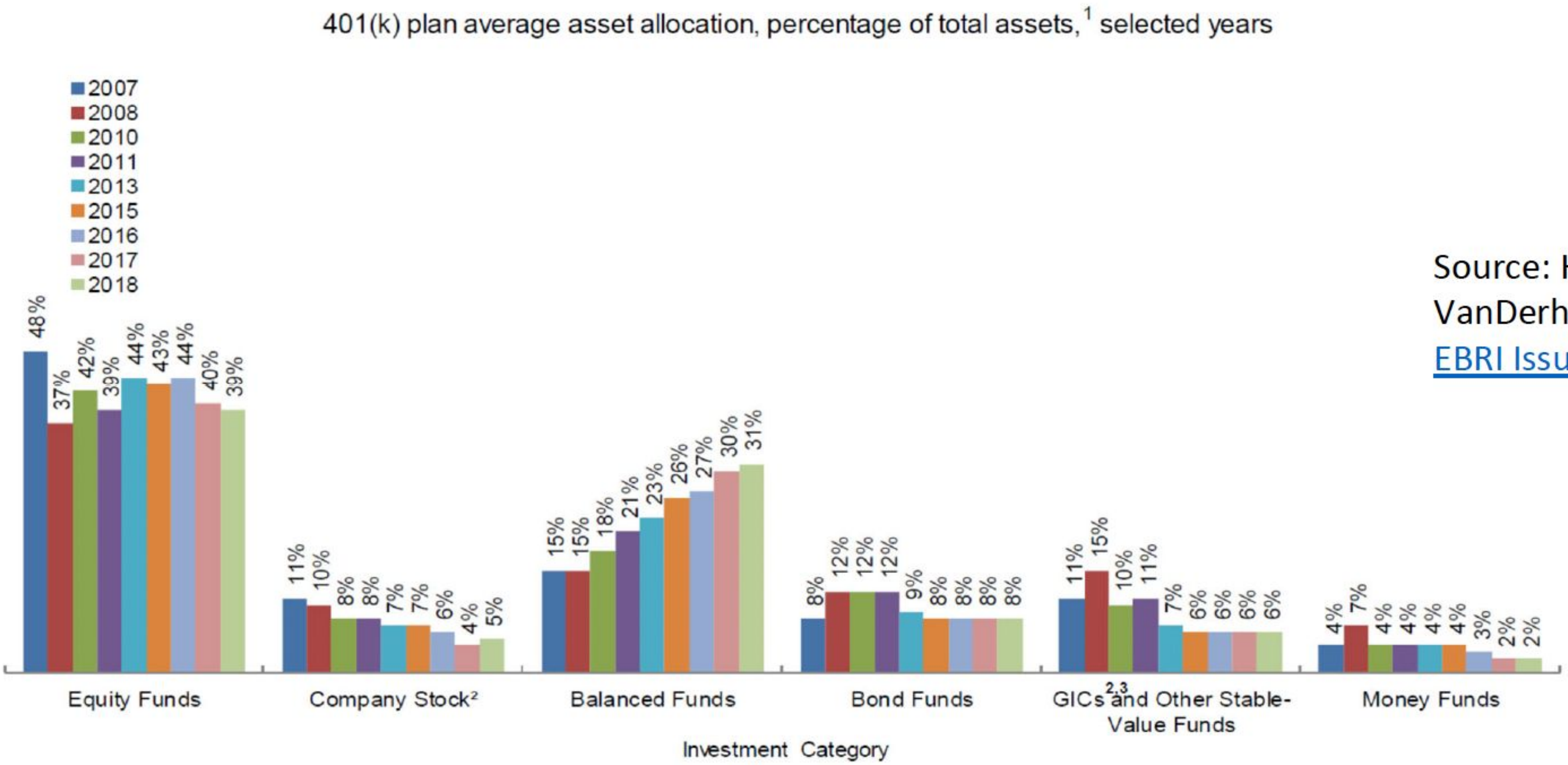
- For a Roth account,
  - You can always withdraw the money you contributed without penalty or taxes (since you already paid taxes on it).
  - You can also withdraw your capital income earned in the account free of penalties or taxes after age 59 ½ if your account is at least 5 years old.
  - If you want to withdraw your capital income earlier, you pay both taxes and a 10% penalty except in mitigating circumstances similar to those of traditional accounts.
- Some employers offer the option of borrowing against your 401(k) which is a good substitute for a withdrawal.
  - No taxes or penalties, and the repayment schedule of the loan forces you to restore your retirement savings in the aftermath of an emergency.

Changing Jobs

- When you change jobs, the question arises what you do with your old 401(k) plan.
- The options are:
  - Keep the old 401(k) account without making any new contributions to it (usually possible unless the balance is very small).
  - Roll the money over to a 401(k) with your new employer.
  - Roll the money over to an IRA (appealing if you like investment flexibility, but you no longer benefit from the carefully screened investment choices offered by employers).
  - Withdraw the money (but then you may face taxes and penalties).

Age and Risk

How Are 401(k) Accounts Invested?



Source: Holden, VanDerhei, and Bass, [EBRI Issue Brief](), 2021.

Changes in 401(k) Investing

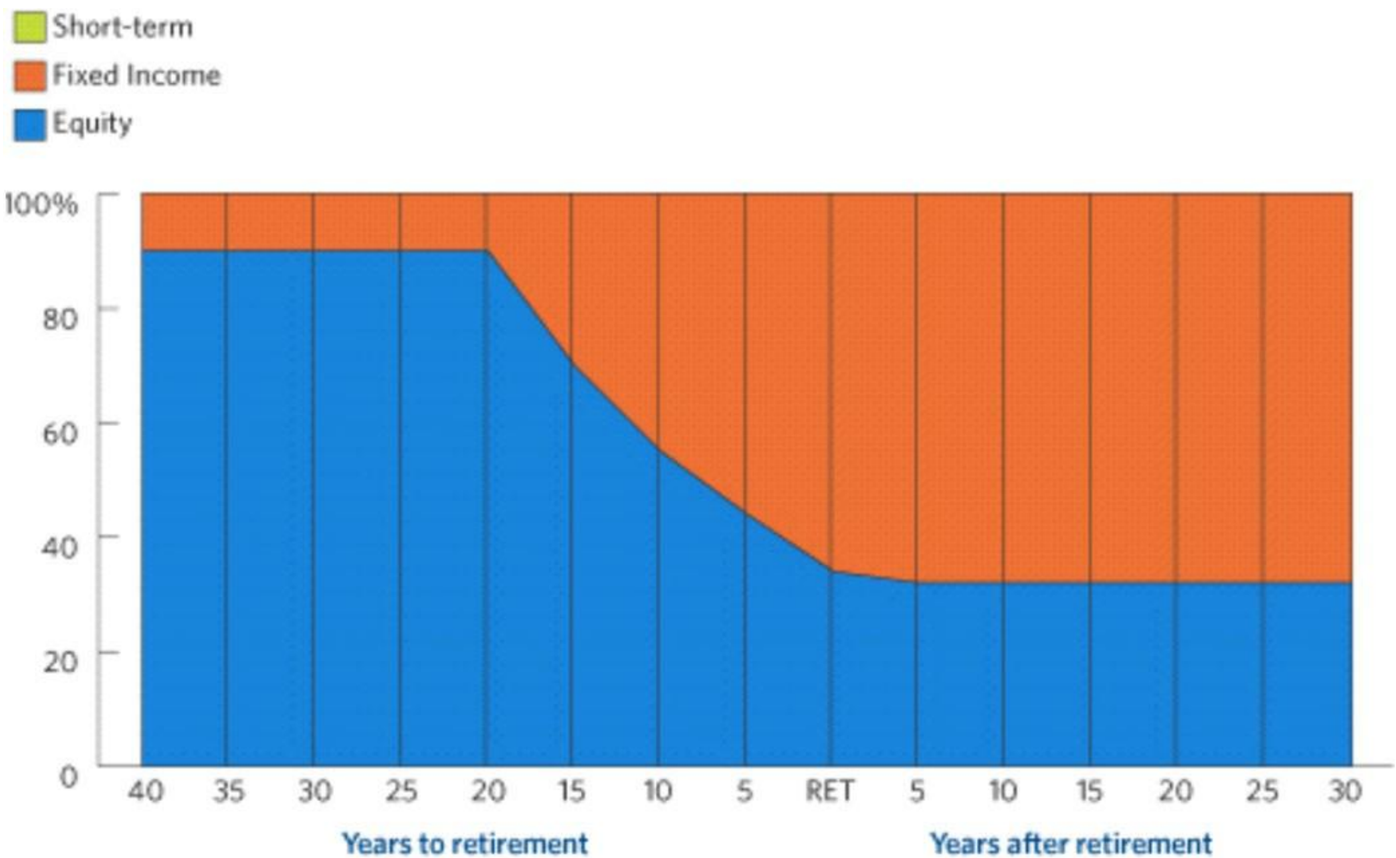
- There has been considerable progress in recent years:
  - Less company stock (which employers like to sell to employees, but which dangerously concentrates their risk exposure).
  - Less money market funds (too low a return to finance retirement).
  - More **balanced funds** which hold both bonds and stocks.
  - Most of these are **target date funds** (TDFs) which start out with more equity and shift into bonds as your retirement date approaches.
- Some of this progress results from rule changes in the **Pension Protection Act** of 2006, which made it easier for employers to offer TDFs as a default option in their 401(k) plans.
  - So what is the argument for TDFs as a retirement investment?

Age and Risk (1)

- Standard advice is to invest more aggressively when you are young, and cut back risk as you get older. A common rule of thumb says the risky share should be (100 - A)%, where A is your age.
  - So about 80% for you!
- This is not because older people necessarily become more risk averse, but because young people have an enormous hidden asset: your future earning power or **human capital**.

A Typical TDF Glide Path

- Target date funds are a way to implement this strategy.
- Details vary, but an illustrative glide path is shown below.



Source: Investment Company Institute.

Time Diversification

- Another way to understand the argument for TDFs is to notice that your expected dollar return on equities over your lifetime depends on your average lifetime dollar allocation to equities, and not the timing of that allocation.
- But the risk you take with your equity investing is less if you spread the dollar investment out over time rather than concentrating it in a single period.
  - “Half stocks all the time” is safer than “All stocks half the time”.
  - This is sometimes called **time diversification**.

Time Diversification: Example (1)

- Suppose you have $100,000 to invest in each of two periods.
- In each period, the safe real interest rate is 0% but you can invest in the stock market whose return is +20% with probability ½ and -10% with probability ½, implying an expected return of 5%.
- If you invest $100,000 in one period, and nothing in the other, your expected dollar return is 5% x $100,000 = $5,000.
- If you invest $50,000 in each period, your expected dollar return is unchanged at 2 x 5% x $50,000 = $5,000.
- But what about the risk?

Time Diversification: Example (2)

- If you invest $100,000 in one period, and nothing in the other, your dollar return is $20,000 with probability ½ and $-10,000 with probability ½, for a standard deviation of $15,000.
- If you invest $50,000 in each period, your dollar return is $20,000 with probability ¼, $5,000 with probability ½, and $-10,000 with probability ¼ for a lower standard deviation of $10,606.
- It’s safer to keep the dollar allocation to stocks constant over time.

Time Diversification: Example (3)

- Now suppose that you start the first period with only \$50,000 to invest but you receive a riskless salary of \$50,000 at the end of the first period which you add to your savings to invest \$100,000 in the second period
- The best strategy is still to invest \$50,000 in stocks each period.
- But now this corresponds to an equity share of 100% in the first period, and only 50% in the second period.
- The “hidden safe asset”, your salary, is turned into financial assets in the second period.

TDFs: Good But Not Perfect

- Although TDFs are good retirement savings vehicles, they are not perfect.

1. The argument we just gave implies that if you have more saving relative to your income (either because you have saved more or because the stock market has done well), then you should cut back your equity share.
   - TDFs don't do this, they only adjust the equity share to your age.
2. Some TDFs are actively managed, inadequately diversified, and charge inappropriately high fees.
   - What seems to be happening is that less established mutual fund companies are competing on performance, trying to get lucky and convince employers to hire them to manage their 401(k) plans.

Retirement Saving: The Bottom Line

- Start saving in tax-favored accounts as soon as you can.
- If possible use a Roth account at first.
- Take full advantage of employer matching payments to 401(k) plans.
- If you have moderate to high income, make the largest allowable contributions to tax-favored retirement accounts.
- Invest retirement savings in target date funds so long as these are well diversified and have low fees.
- Otherwise, invest in passive stock and bond funds and rebalance them yourself as you get older.