Mutual Funds

Old-fashioned financial assets

Spy goes ex-dividend on June 21, 2019:

Mudd Finance

Jun 21, 2019	294.13	295.52	293.76	294.00	292.65	83,309,500
Jun 21, 2019			1.432 Dividend			
Jun 20, 2019	296.04	296.31	293.13	295.86	293.07	116,570,000

1. Stock (and options) take the hit on ex-dividend day.
2. Payment is made a month later.
3. Data are adjusted day of dividend for amount of dividend.

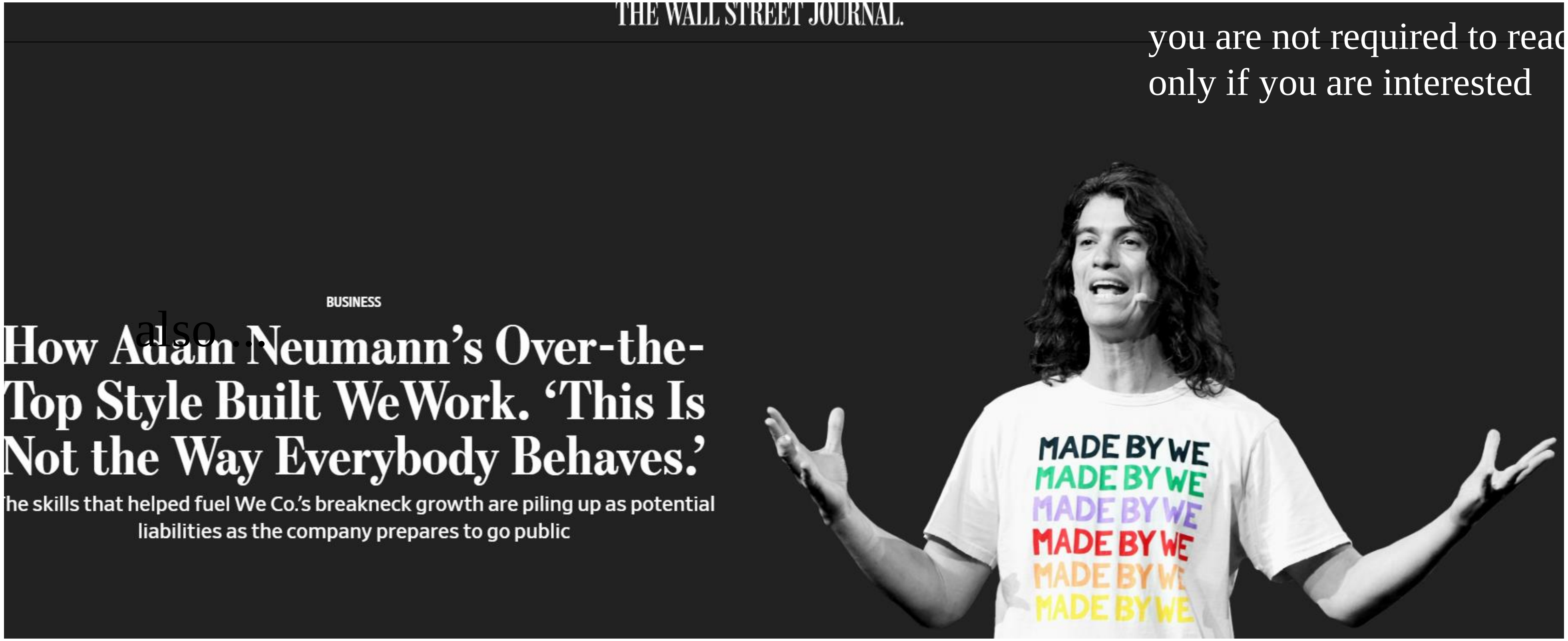
Payment would be $1.432 made on 7/31/2019

1. Actual close was 295.86 – 294.00, down 1.86
2. Dividend was 1.432
3. Adjusted close was 293.07 – 292.65, down 0.42
4. 1.86 – 1.432 = 0.428

Background reading on WeWorks

DWBH

you are not required to read
only if you are interested



THE WALL STREET JOURNAL.

BUSINESS

How Adam Neumann's Over-the-Top Style Built WeWork. 'This Is Not the Way Everybody Behaves.'

he skills that helped fuel We Co.'s breakneck growth are piling up as potential liabilities as the company prepares to go public

also ...

https://www.wsj.com/articles/this-is-not-the-way-everybody-behaves-how-adam-neumanns-over-the-top-style-built-wework-11568823827

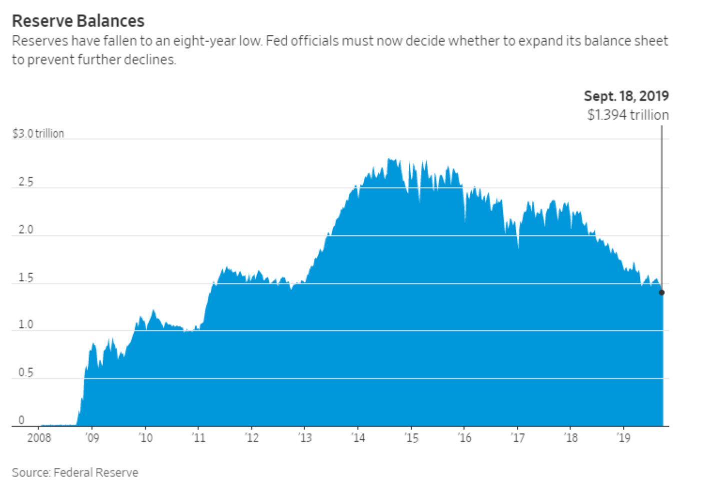
also ...

https://seekingalpha.com/article/4292925-wewtf-part-deux?ifp=0

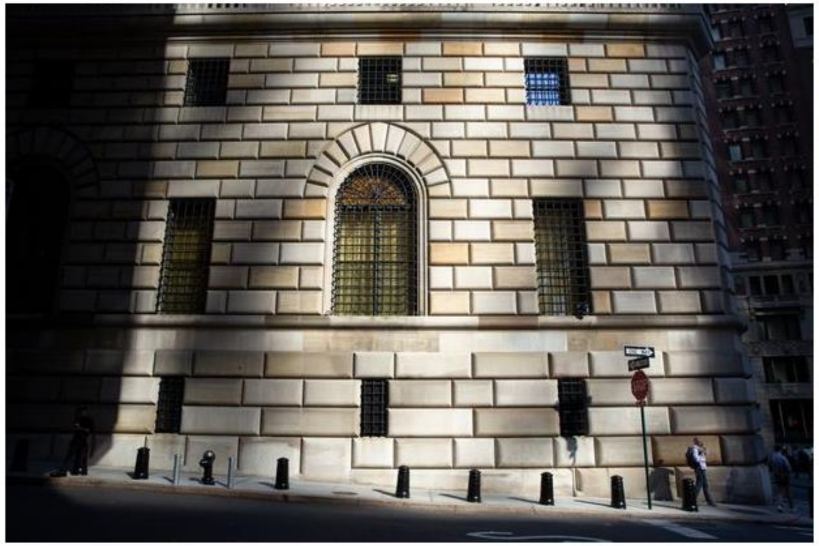
Mudd Finance

Topical ... the REPO crisis

DWBH



Sunday



MARKETS

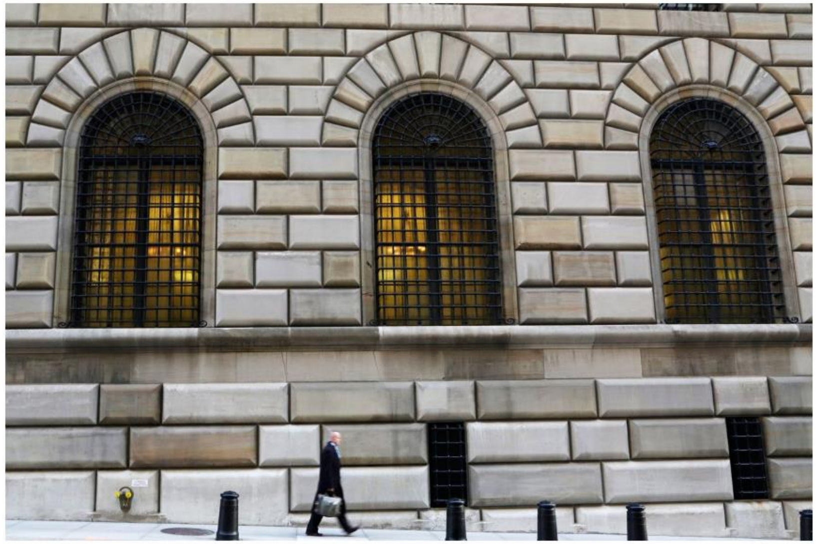
'Why Were They Surprised?' Repo Market Turmoil Tests New York Fed Chief

After years of calm, the financial regulator under chief John Williams must show it can tamp down unexpected turbulence in overnight money markets that has spooked investors. 66

Today

Fed Adds $63.5 Billion to Financial System in Repo Transaction

Latest transaction seeks to relieve funding pressure in money markets



The Federal Reserve Bank of New York has used repurchase agreements, or repo, to relieve funding pressure in money markets. PHOTO: MARK LENNIHAN/ASSOCIATED PRESS

By Dave Sebastian
Sept. 30, 2019 8:27 am ET

RECOMMENDED VIDEOS

1. Four Takeaways From the Whistleblower Complaint
2. Key Moments From Rough Transcript of Trump's Call With Ukraine
3. Three Cities That Challenge Hong Kong's Financial-Hub Status
4. Highlights From President Trump's U.N. Address
5. European Leaders Push U.S., Iran to Forge New Nuclear Deal

MOST POPULAR ARTICLES

1. Opinion: John Durham's Ukrainian Leads
2. He Was the NBA's Best Ref. Then He Went to a Catholic Seminary.
3. Does Getting Stoned Help You Get Toned?

This is now projected to continue through October 10! About $200 billion have already been added with no real explanation.

WSJ | ECONOMY

U.S. Edition ▾ | September 30, 2019 | Print Edition | Video

Reminder ...!

- First exam is a week from today, Monday, October 7
- Remember the retirement reading (Appendix A) and video!
- A video with detailed study instructions will be posted Thursday or Friday.
- An email with special instructions for students with special needs or who are traveling or who have time conflict will be released on Thursday and will require a direct response.
  - Special needs students do not need to show me documentation, but the documentation must exist.
  - I have to be informed of travel needs in advance
  - I cannot waive the exam because of your busy schedule.
- The exam will be a combination of T/F, matching, multiple choice single answer and multiple choice multiple answer.
- I will post more information about the new format online this week with a **voluntary trial exam**.

Introduction to Portfolio Structures

In our analysis, it is useful to think of our financial assets as constituting a large portfolio. We represent this portfolio as a pie chart that represents the relative proportions and contributions of the components of our portfolio.

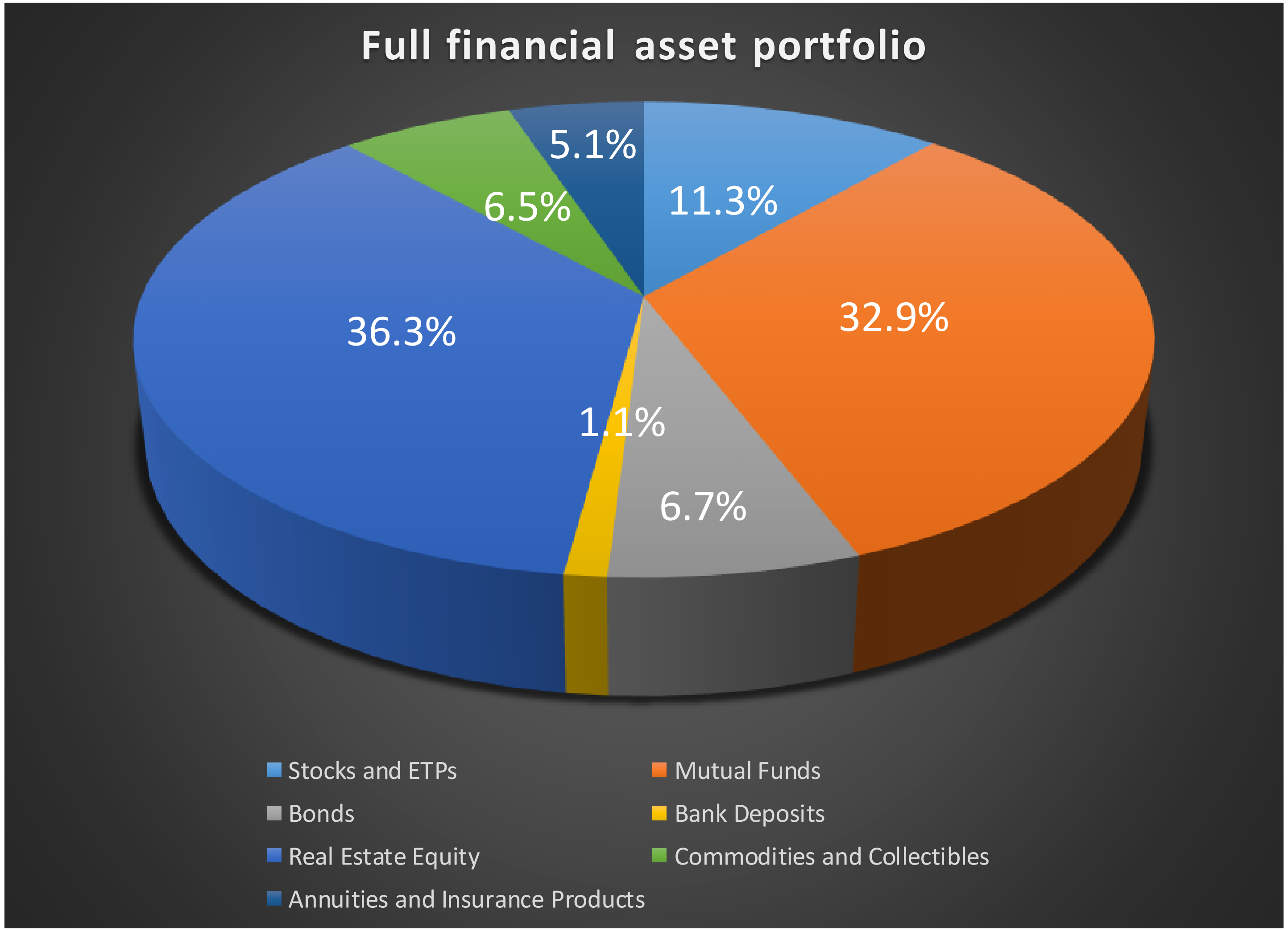
This enables us to consider tradeoffs between risk and yield in alternative portfolios and encourages us to consider rebalancing portfolios in the face of a changing economic, political, or financial environment.

Remember that as we consider portfolios consisting of bonds and stocks, bonds are considered to be safer than stocks, but offering lower yields. Therefore we can adjust for risk by rebalancing the composition of our portfolio to alter the relative proportions of stocks and bonds.

Hypothetical complete list of assets: age 45

Assets	Value	%age
Stocks and ETPs	142,218	11.3%
Mutual Funds	412,367	32.9%
Bonds	84,593	6.7%
Bank Deposits	14,367	1.1%
Real Estate Equity	455,000	36.3%
Commodities and Collectibles	82,000	6.5%
Annuities and Insurance Products	64,000	5.1%
Total:	1,254,545	100.0%

Representing the same as a portfolio …



Stripping out the non-liquid assets and leaving only the liquid investment assets

Assets	Value	%age
Stocks and ETPs	142,218	11.3%
Mutual Funds	412,367	32.9%
Bonds	84,593	6.7%
Bank Deposits	14,367	1.1%
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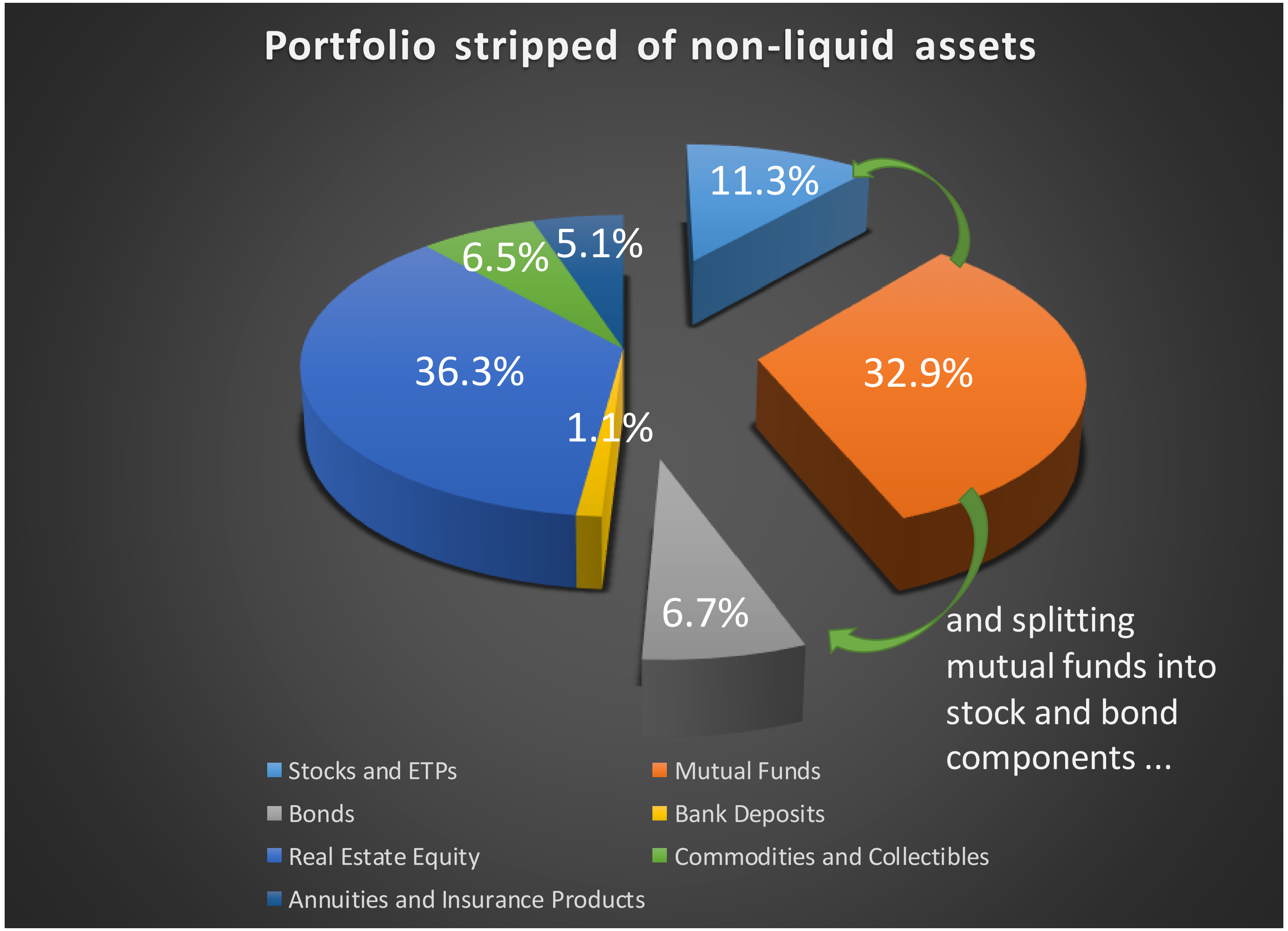
Commodities and Collectibles	82,000	6.5%
Annuities and Insurance Products	64,000	5.1%
Total:	1,254,545	100.0%

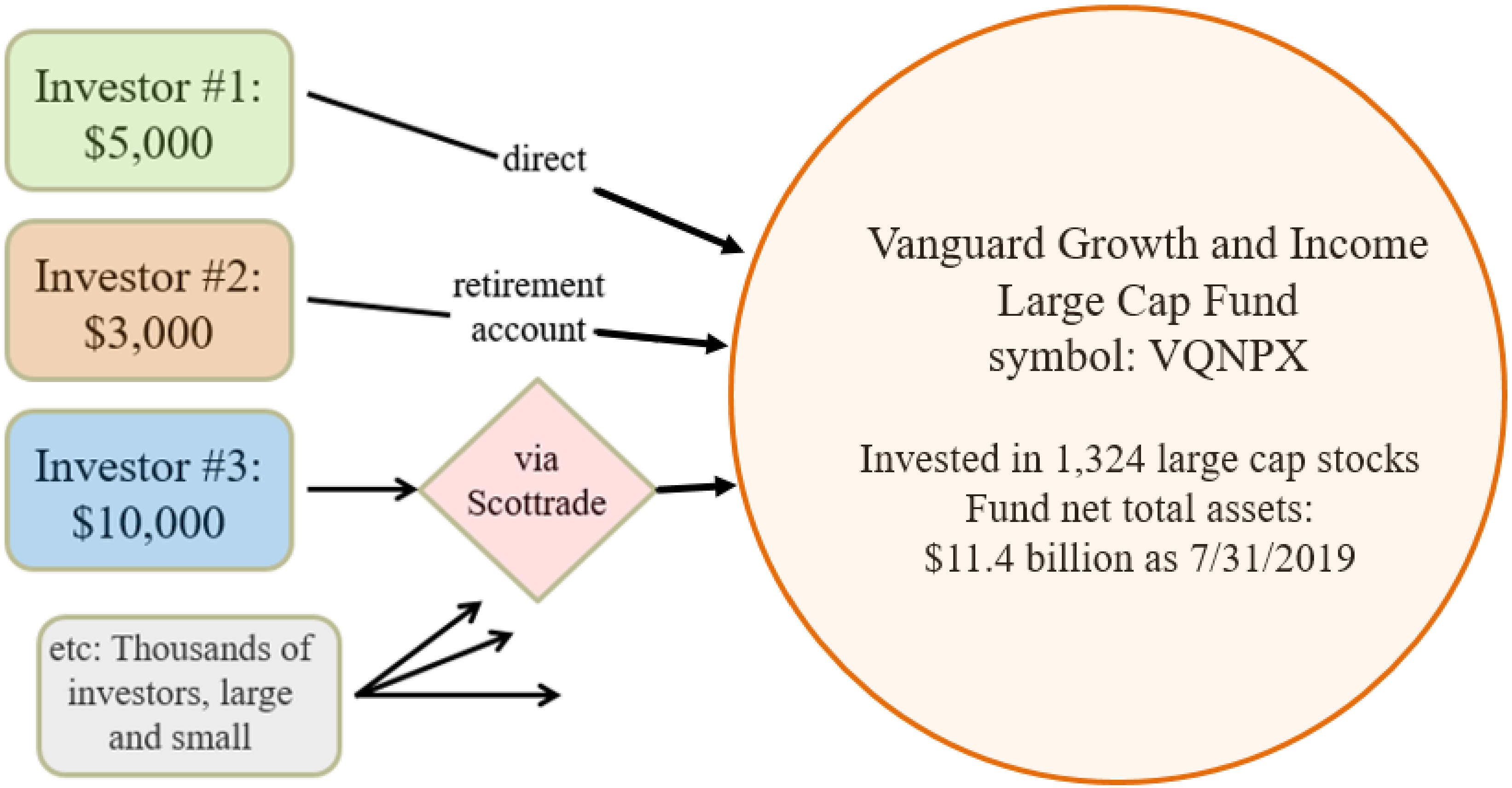
… and consolidating mutual funds into their stock or bond components.

Assets	Value	%age
Stocks	418,380	65.0%
Bonds	224,798	35.0%
Total:	643,178	100.0%

The same from the perspective of the portfolio



Investment Channels for Investing in VFINX



.... from Chapter 5, which will provide most of your guidance about mutual funds.

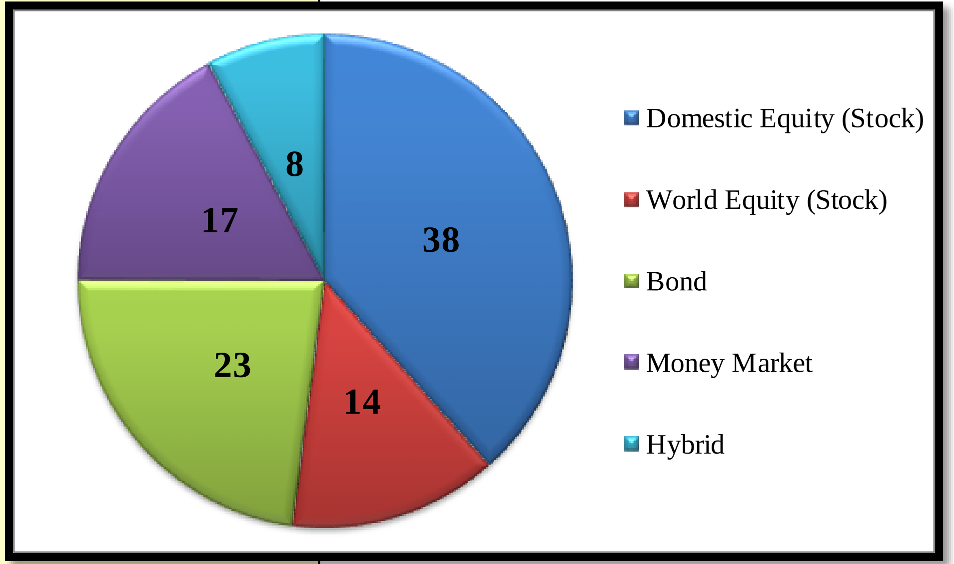
General Funds Families

- **Equity** (stocks)
- **Yield-bearing Financial Assets (YBFA)**
  - U.S. Treasury
  - Corporate and other bond and note
- **Money Market**
  - YBFAs with maturities of less than one year
- **Hybrid**
  - A mix of the above
- **Target Retirement** (i.e. Target Retirement 2050)
  - I don't like these, high churn rate

… and globals in all of these.

General Equity Mutual Fund Categories

- Income
  - conservative; stresses dividends and established companies
- Growth
  - riskier; target high cap gains, fast growth companies
- Index
  - pegged to an index like the S&P 500
- Specialty
  - small cap, sector, industry, etc.
- Mixed/Hybrid



Primary Benefits of Mutual Funds: Diversification

Mutual Fund Fees

Fee	For What?	Acceptable Level
Expense ratio	Summary of all expenses except loads	Below 1% (see handout)
Loads	Sales commission charge	0 - none
CDSC and other deferred	To rip you off	0 - none
Management fee	To manage the fund	Same as expense ratio
12b-1	Advertising fee	0 - none

See Chapter 5 Figure 5 **Acceptable Mutual Fund Fees**

Hidden churn fees

Wall Street Journal article "*The Hidden Costs of Mutual Funds*" March 1. 2010, points out that high-churn (high turnover) managed funds, some with 100% turnover, generate excessive hidden fees not shown in expenses because of trading costs:

1. Brokerage commissions
2. Bid/Ask spreads
3. Market-impact costs

The latter reflect that large-scale transactions (such as large purchases) which, as we know, potentially involves dark pools and ISOs, sometimes impact the market adverse to the purchase.

Some analysts estimate this hidden cost to be as high as 3% for some funds.

That's why I don't like high turnover funds and why I specifically don't like Target Retirement Funds! The "**turnover ratio**" is in the prospectus.

More on hidden churn ...

From the prospectus of the Vanguard 500 Index Fund, September 2018:

Portfolio Turnover

The Fund pays transaction costs, such as commissions, when it buys and sells securities (or "turns over" its portfolio). A higher portfolio turnover rate may indicate higher transaction costs and may result in more taxes when Fund shares are held in a taxable account. These costs, which are not reflected in annual fund operating expenses or in the previous expense examples, reduce the Fund's performance. During the most recent fiscal year, the Fund's portfolio turnover rate was 3% of the average value of its portfolio.

The important point is that these churn transactions fees are ***not*** represented in the fund's fee structure. These are internal and show up as reduced yield. This is the primary problem with "managed funds" and especially target-yield funds.

Tax issues (see ch. 5)

Funds that have high churn and are not part of a retirement portfolio which is tax exempt can generated fairly high taxes even though you have not sold any portion of the fund – because internal fund trades (when the fund's manager sells assets to rebalance) generate capital gains!

2019 Long-term Capital Gains (LTCG) Tax Rates

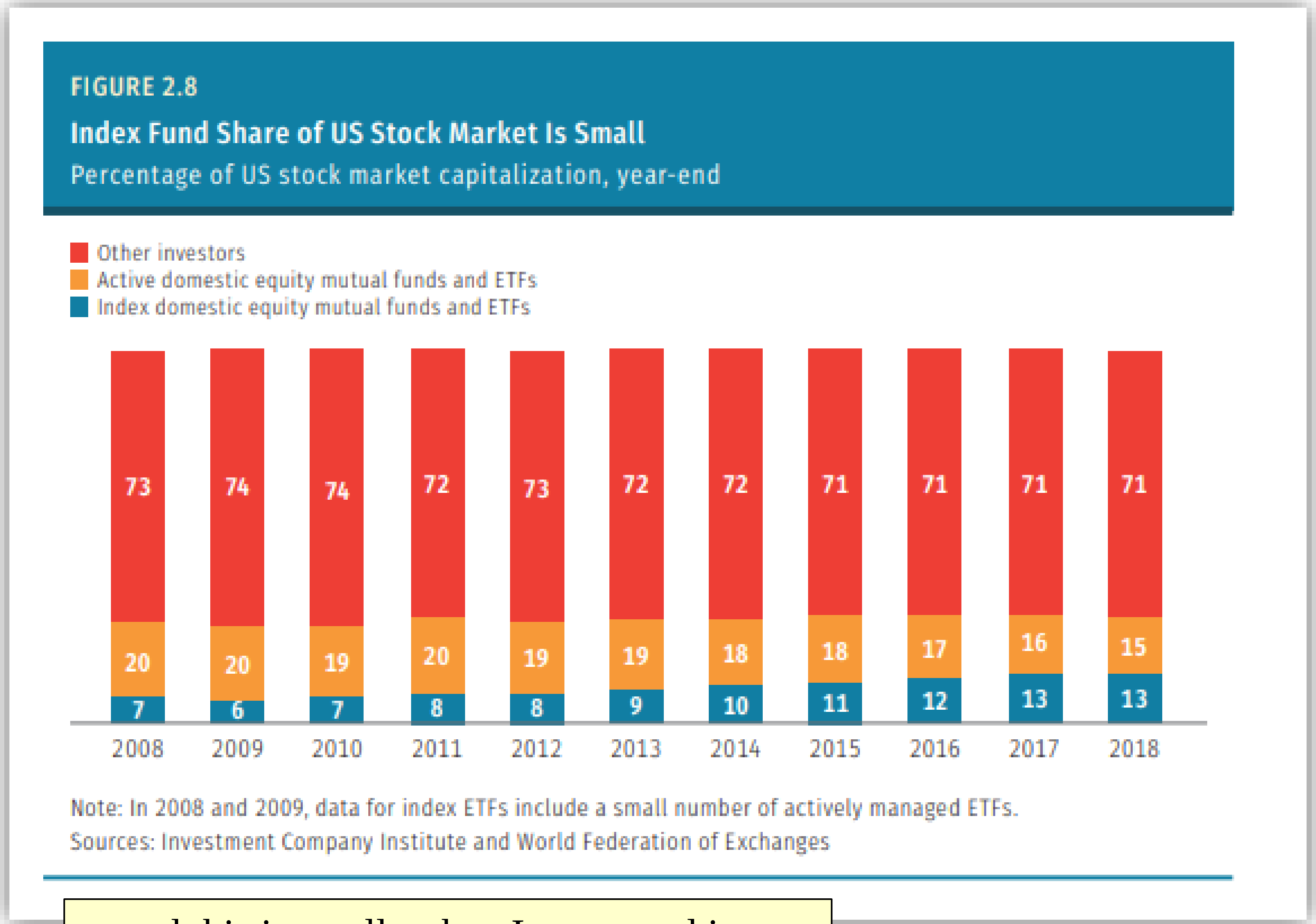
as determined by earned income tax brackets

	Earned income		
LTCG bracket	Single	Joint	Head of Household
0% bracket	$0 - $39,375	$0 - $78,750	$0 - $52,750
15% bracket	<$ 434,550	< $488,850	<$461,700
20% bracket	> $434,550	> $488,850	>$461,700

To qualify for LTCG, the asset in question must be held for one year or more. Assets held for less than one year are taxed at ordinary income rates. These rates also apply to qualified dividend payments.

Source: Internal Revenue Service

Mutual funds and ETFs share of US Stock Market is only 28%

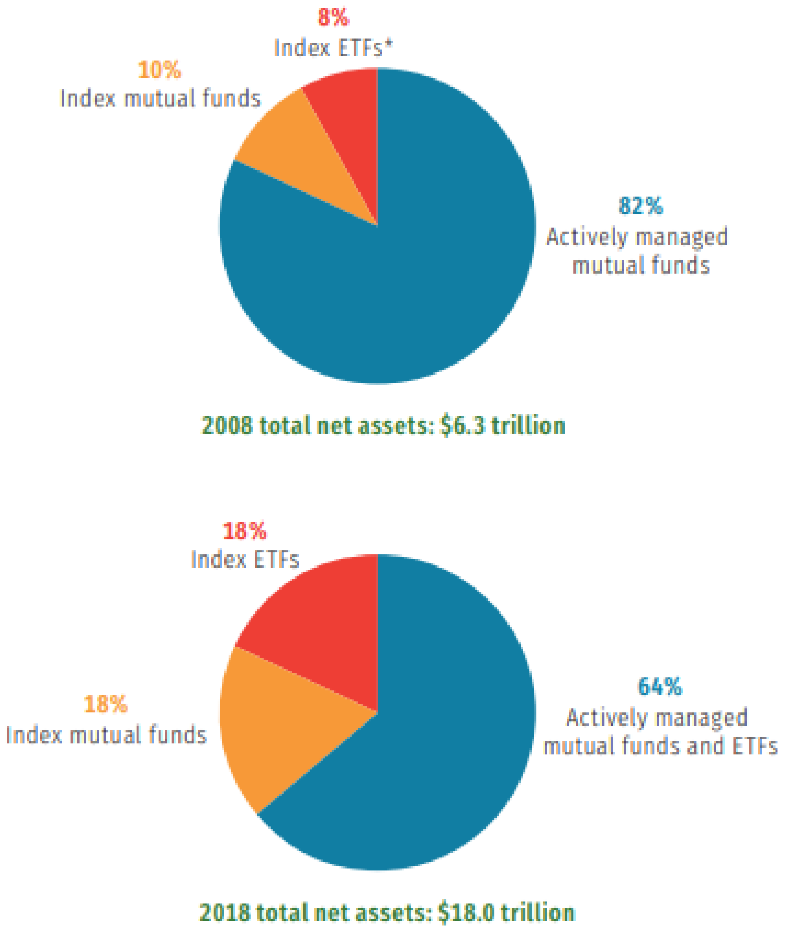


Despite their recent rapid growth, index domestic equity mutual funds and ETFs remain a relatively small part of US stock markets, holding only 13 percent of the value of US stocks at year-end 2018 (Figure 2.8). Actively managed domestic equity mutual funds and ETFs held another 15 percent, while other investors—including hedge funds, pension funds, life insurance companies, and individuals—held the remaining 71 percent.

... and this is smaller than I suggested in a previous lecture.

The General Popularity of the S&P500 Index Funds

FIGURE 2.7
Index Funds Have Grown as a Share of the Fund Market
Percentage of total net assets, year-end



Stopped here

My favorite, where I invest for myself and others:

Investor Shares & Admiral™ Shares

Vanguard 500 Index Fund Investor Shares (VFINX)
Vanguard 500 Index Fund Admiral Shares (VFIAX)

Shareholder Fees
(Fees paid directly from your investment)

	Investor Shares	Admiral Shares
Sales Charge (Load) Imposed on Purchases	None	None
Purchase Fee	None	None
Sales Charge (Load) Imposed on Reinvested Dividends	None	None
Redemption Fee	None	None
Account Service Fee (for certain fund account balances below $10,000)	$20/year	$20/year

Annual Fund Operating Expenses
(Expenses that you pay each year as a percentage of the value of your investment)

	Investor Shares	Admiral Shares
Management Fees	0.12%	0.03%
12b-1 Distribution Fee	None	None
Other Expenses	0.02%	0.01%
Total Annual Fund Operating Expenses	0.14%	0.04%

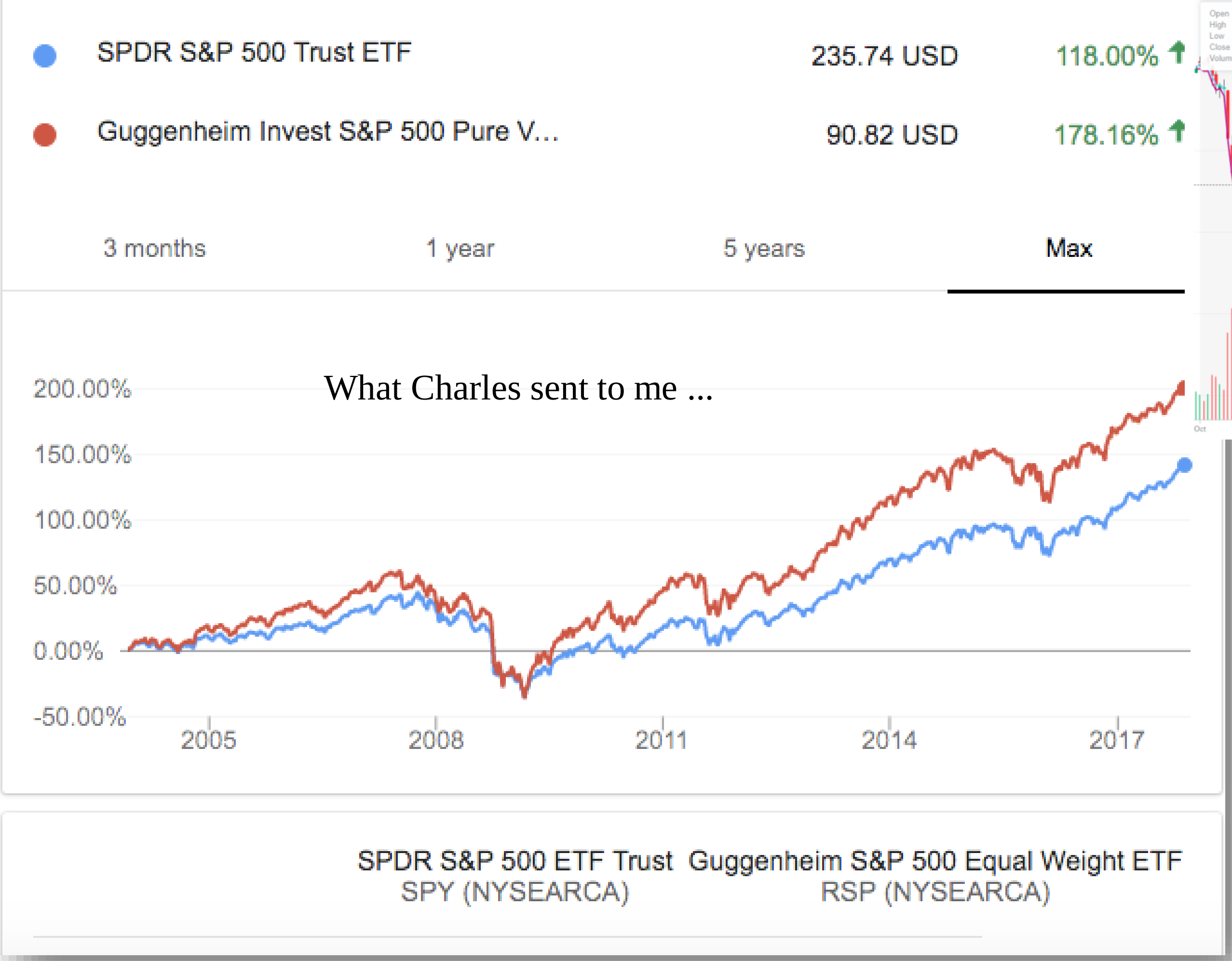
and portfolio turnover rate has been 3% annually since 2013.

as of April 27, 2018. Source is Fact Sheet for this fund on the web site and the April 2018 prospectus.

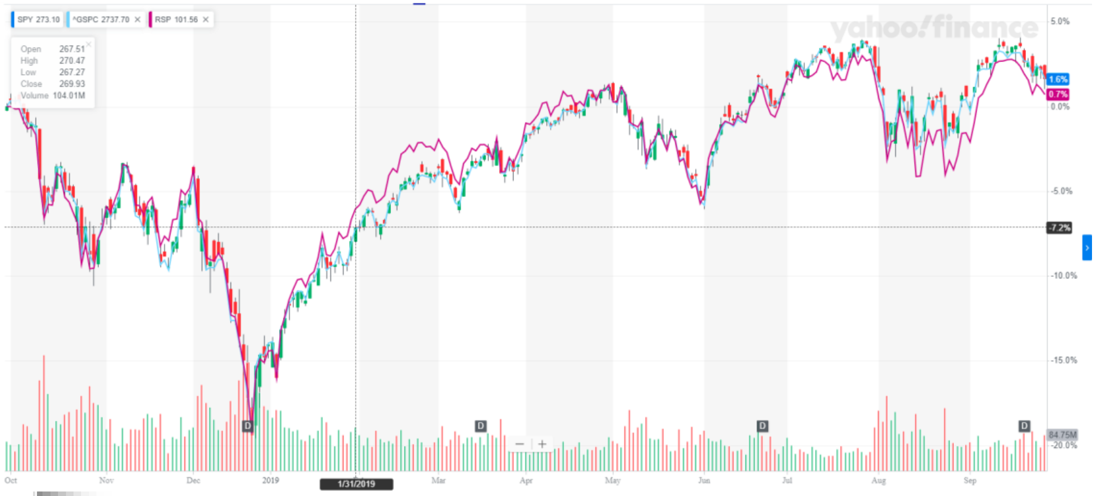
Why your teacher strongly favors S&P500 Index Funds and other conservative index funds

- Extremely diversified – as goes the market, so goes your fund.
- Typically outperforms 85% to 90% of all other mutual funds.
- Extremely low fees and expense ratios – typically around 0.10% (one tenth of one percent) or lower!
- Absolutely no churning – and therefore no interim tax liability! Low turnover ratio (below 10%).
- Available from all reputable low-fee funds families and often available in 401-K plans.

Note from Mudder Charles Matlack ... compare S&P 500 equal weight to SPY:



What Charles sent to me ...



This year it was a tie ...

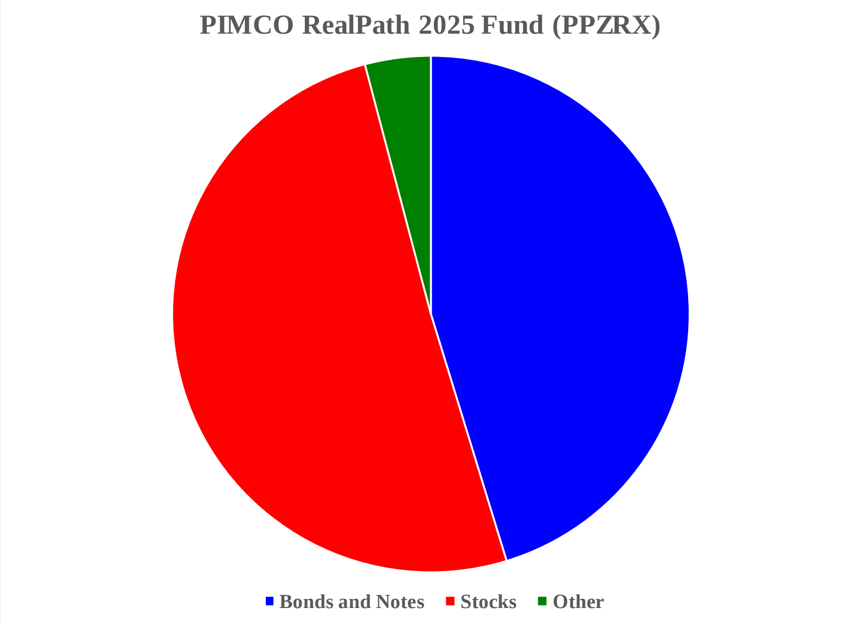
Target-date Funds (retirement dates)

Pimco RealPath (Target-Date) 2025 Fund

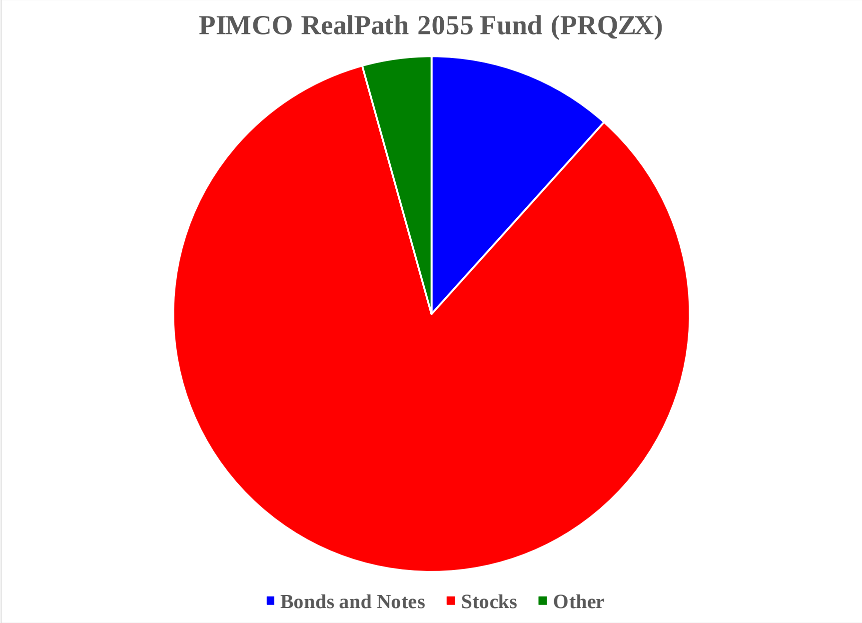
PPZRX: (as of 9/22/2019)

Assets	%2019
Core US bonds	13.72
Long-Term US Treasures	6.91
Inflation-linked bonds & TIPS	11.69
High Yield bonds	10.62
Global bonds	1.48
Global equities	10.81
US large cap stocks	28.12
US small cap stocks	2.22
Emerging market stocks	8.52
Real Estate	4.03
Commodities	0.00

Total expenses 0.43%



2055



Pimco RealPath (Target-Date) 2055 Fund

PRQZX: (as of 9/22/2019)

Assets	% 2019
Core US Bonds	0.65
Long-term US Treasuries	0.43
Global bonds	0.06
High Yield bonds	9.60
Inflation-linked bonds & TIPS	0.70
US large cap stocks	47.33
US small cap stocks	4.01
Global stocks	20.56
Emerging market stocks	10.68
Real estate	4.25
Commodities	0.00

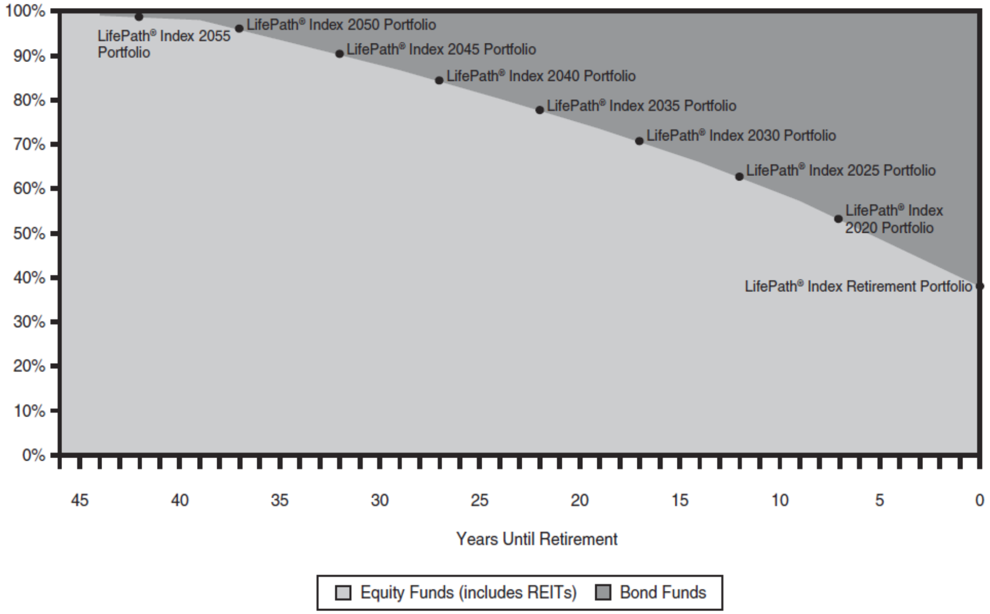
Total expenses 0.23%

Note the mix of bond, equity, and alternative. The fund is re-balanced to more conservative as one ages. (As you age, you are not rolled into a new fund – the fund rebalances).

2055 Fund turn-over rate was 45% in 2018! (Not publishing the same in 2019).That is a lot of churn!

Source: *PIMCO website and prospectuses for these funds.*

Your teacher's growing suspicions about Target Date Funds



1. Their fee's are usually quite high – some have loads.
2. They have high churn, which implies high embedded fees.
3. Many do not invest in stocks directly – they invest in other mutual funds (OK if the root funds are conservative) or other financial assets, including ETPs.

My advice – use index funds and rebalance yourself.

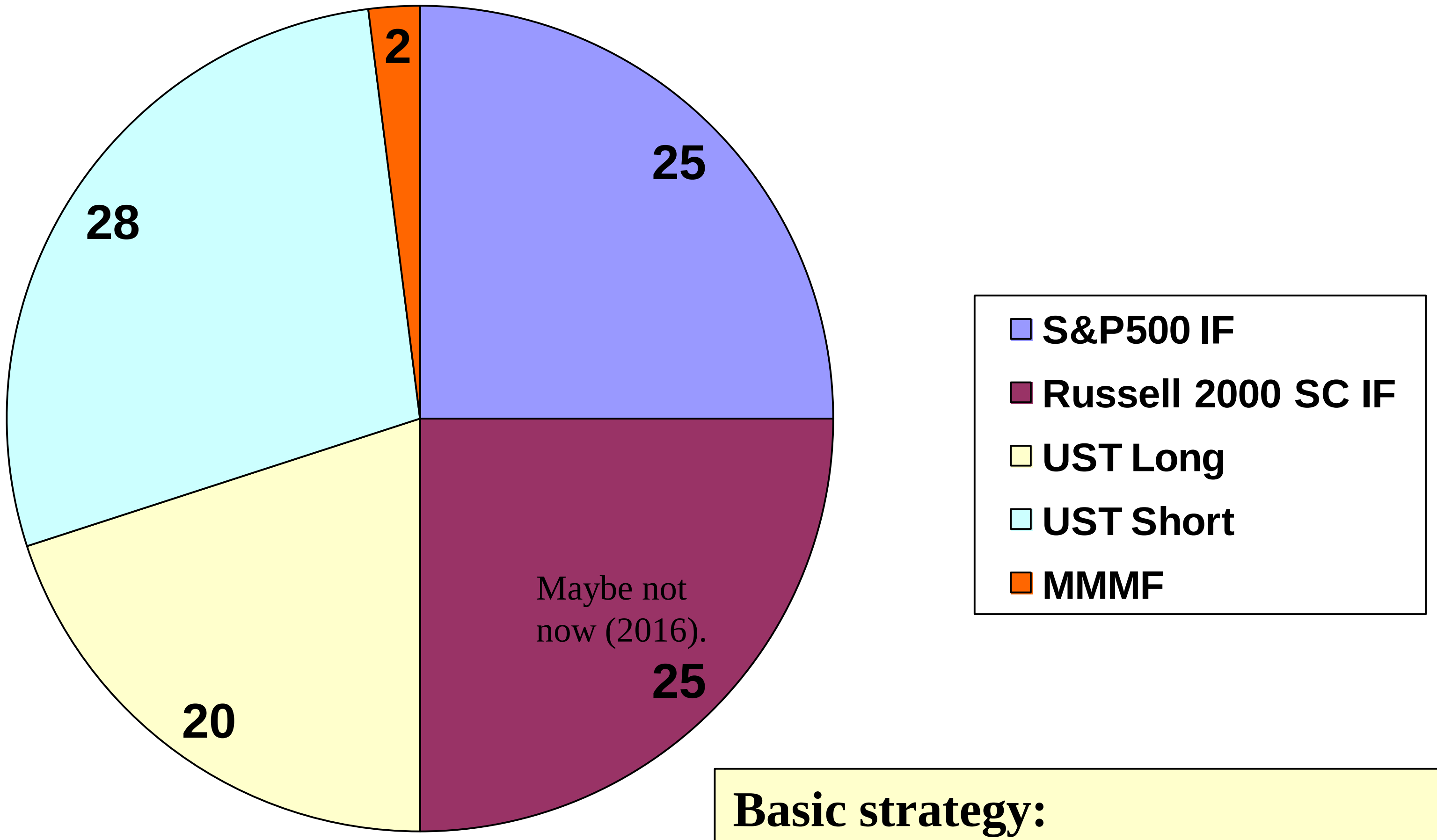
401-Ks and Mutual Funds

- See the assigned reading an all types of retirement accounts.
- When you go to work you will be typically be given the option of investing in a 401-K
- Your employer will typically make part of the contribution, which is why you want to MAX it.
- You typically will be offered a limited selection of mutual funds
  - look for index funds in the mix
- The fees may be fairly high for these funds
  - employers don't always do a good job of getting these down
- When you change jobs, you have the right to transfer these funds into a **Rollover IRA** into a fund family of your choice. I recommend this.

Buying mutual funds

- Not like buying stocks!
- You can and should buy online directly from a mutual fund family like Vanguard.
- Although you get mutual fund shares, you buy by a dollar amount rather than any number of shares (i.e. you buy $5,000 worth, not 100 shares).
- You place your order sometime during the day. Your order is executed at the end of the trading day after the stock market has been closed.
- At the time, the fund determines the Net Asset Value of all of its holdings and then determines the per-share NAV of the mutual fund.
- The fund is then sold to you: **shares = $$investment/NAV**
- There are often restrictions on selling the fund back. You may be required to hold the fund for as long as three months before you can sell you shares without penalty.

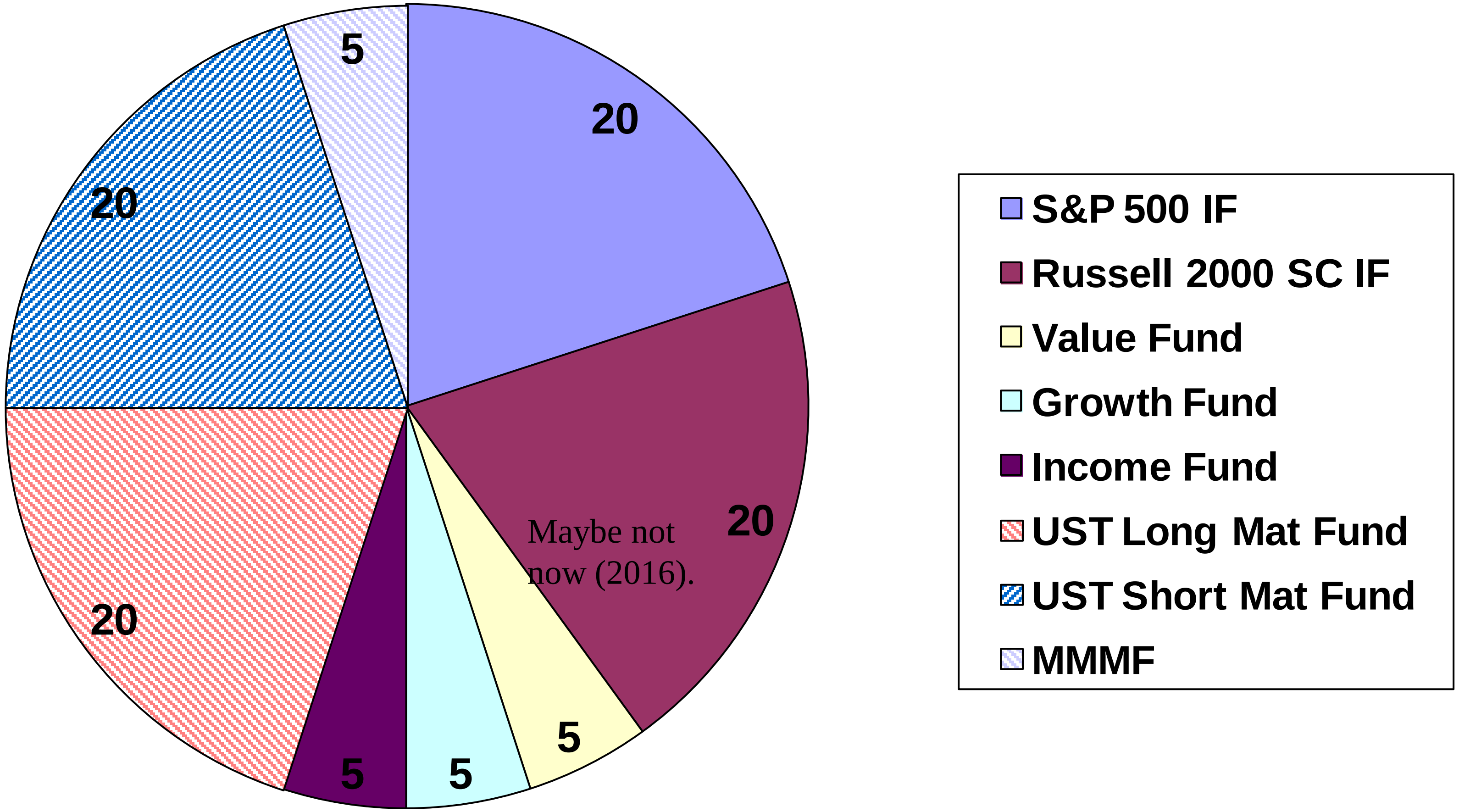
Mutual fund portfolio 1: very basic, very conservative



This is a simple, elementary example. We cover portfolio composition in the future.

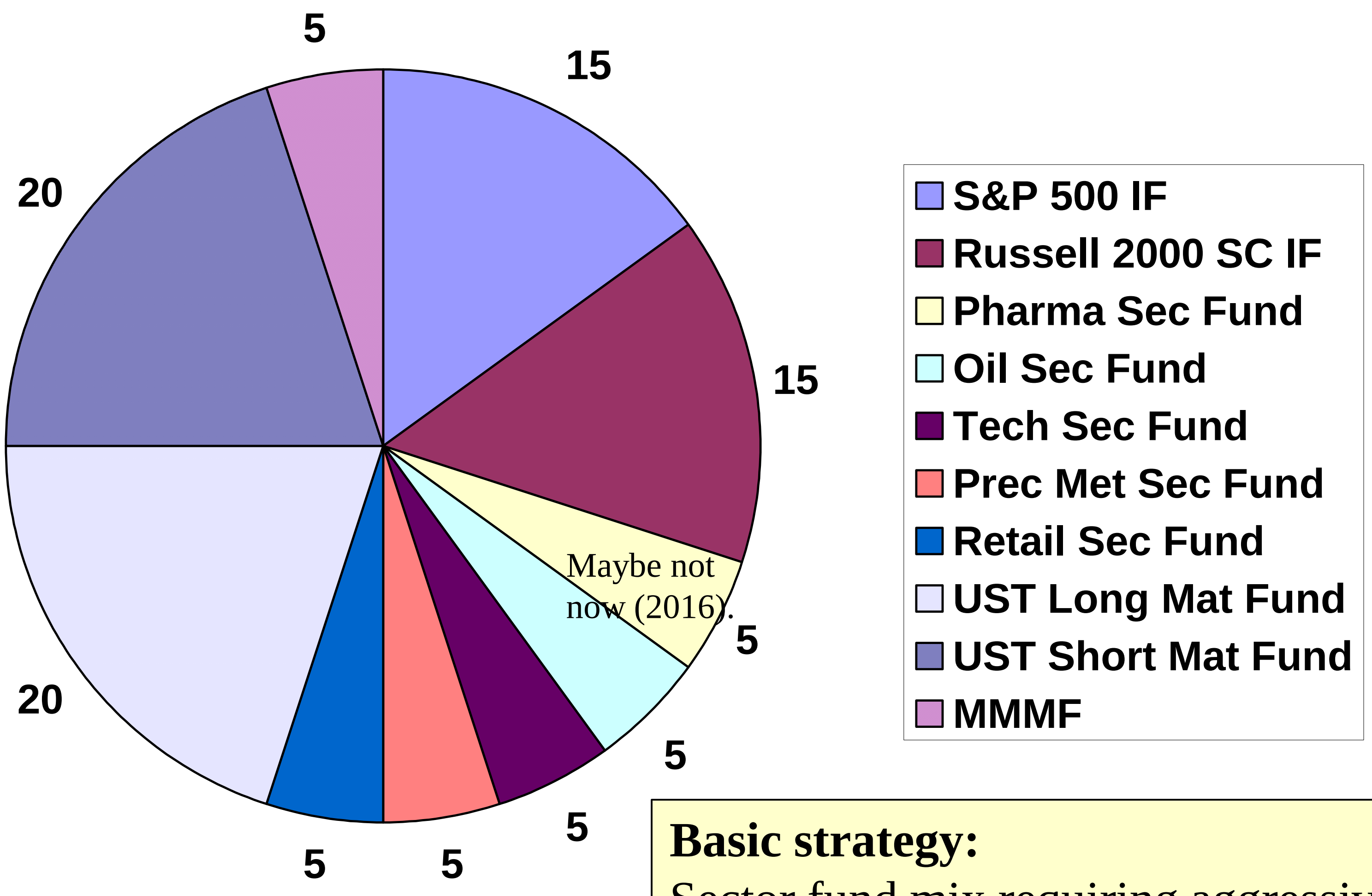
Basic strategy:
Half stock index funds, half U.S. Treasury notes and bonds.
Very conservative.

Mutual fund portfolio 2: Domestic index fund and U.S. Treasury (only)



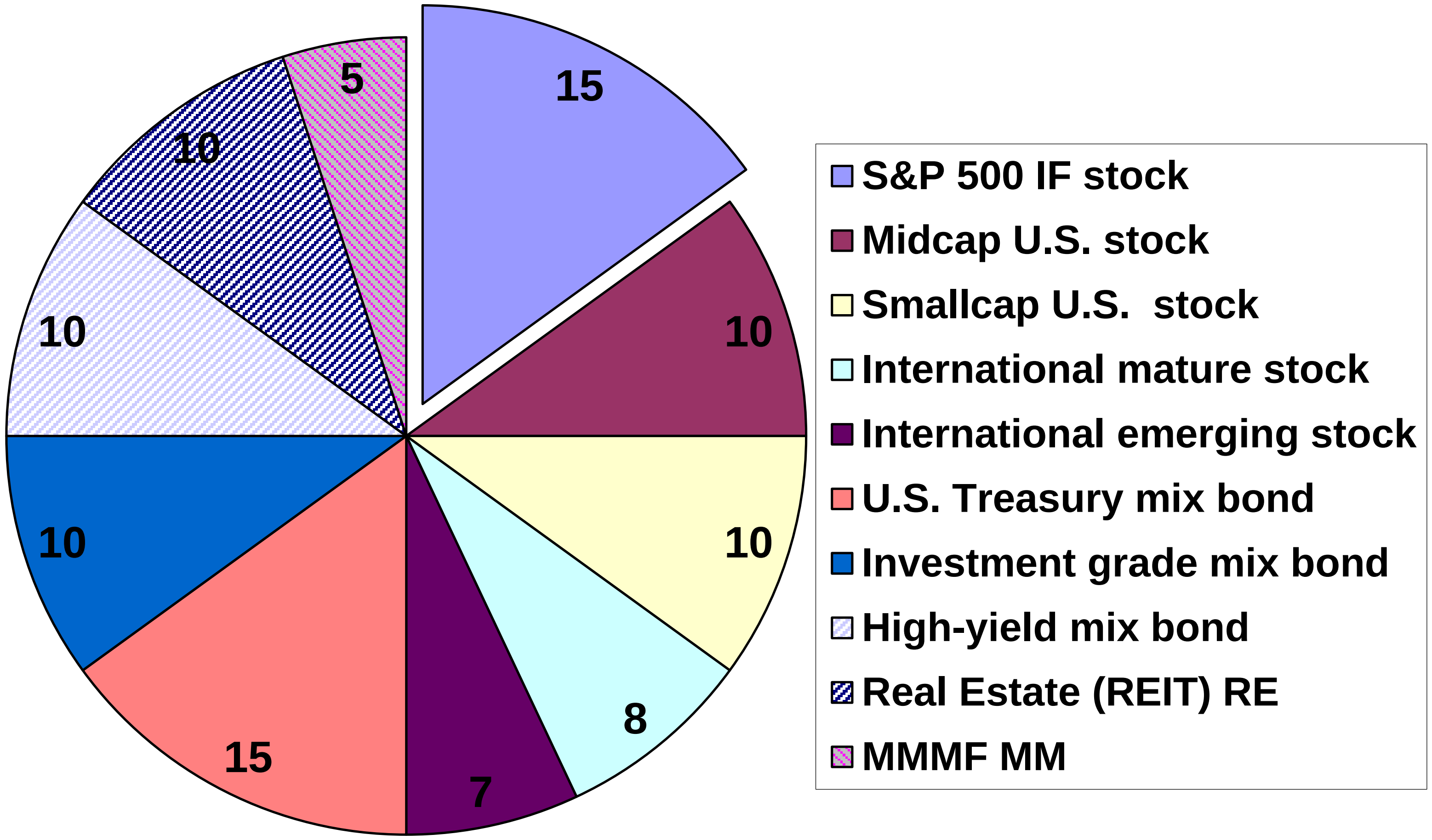
Basic strategy:
60S/40B mix of index and general fund categories. Still very conservative, requires occasional rebalancing.

Mutual fund portfolio 3: Index and sector funds



Basic strategy:
Sector fund mix requiring aggressive attention and research, frequent rebalancing.

Mutual fund portfolio 4: mixed international & multiple bond



Basic strategy:
Mixed fund mix requiring aggressive attention and research, includes international and includes corporate and possibly sovereign bonds. Higher risk level.

Reasonable risk thresholds (passive)

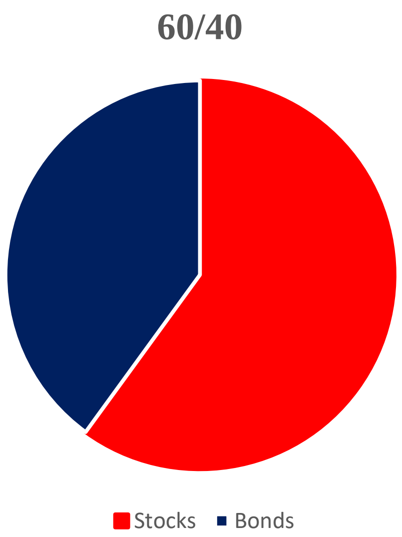
Stocks/bonds ratio

Balance	Risk Level	For whom
80/20	Very high	Young risk takers
70/30	High	Young risk-adverse
60/40	Moderate	Neutral for all, above 50
50/50	Low	Already funded above 60
30/70	Very Low	Above 60 risk-adverse

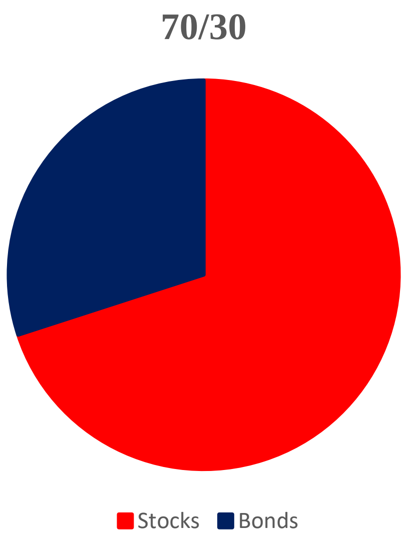
These components are rough guidelines based mostly on age and proximity to retirement, but will depend also on attitude about risk, financial goals and how close you are to realizing them, the extent to which you want to manage your portfolio (active allows higher thresholds for stocks), and your sense of market cycles (which in your teacher's opinion are not all that hard to figure out.

If you target one of these levels then even the passive portfolio will have to rebalance (next slide).

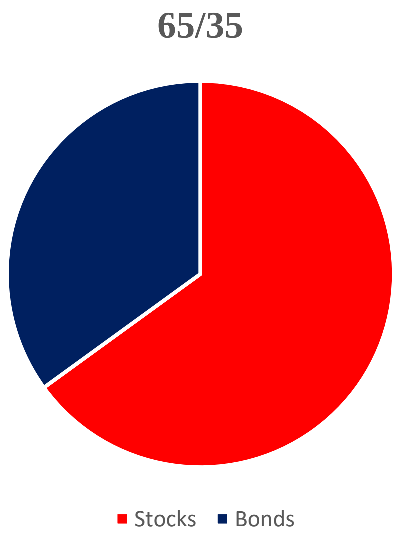
Portfolio rebalancing



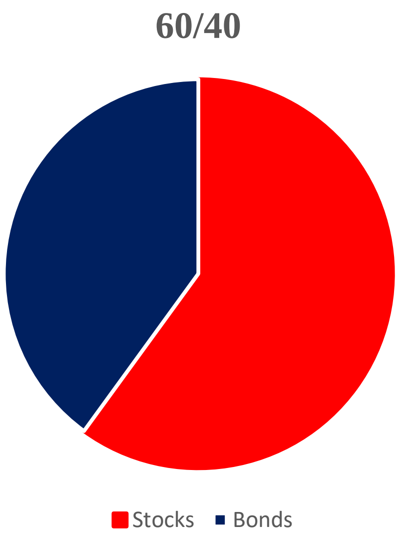
1. Start at 60/40



2. .. so 3 years later you are at70/30



3. .. so you rebalance to 65/35 (or adjust)



4. .. eventually rebalance back to 60/40.

Primary Benefits of Mutual Funds: Diversification

Note: See the other benefits in chapter 5 – here I amplify on the mathematical explanation of diversification, and introduce a related concept, **correlation**.

From Econ 136:

and from our assumptions made in that class, the square root of the variance of the sums is less than the square root of the sum of the variances.

This material is added to that those who understand the math see how portfolio diversity is modeled. You are not accountable for this material in Economics 104.

2-asset Portfolio Variance Sums

Variance is purely additive if two variables are strictly independent:

$$V(x+y) = V(x) + V(y) + 2COV(x,y)$$

remembering that Covariance is equal to the Correlation Coefficient (0 if no perfectly independent, 1 if perfectly correlated, -1 if perfectly polar) times the product of the standard deviations:

$$COV(x,y) = CORREL(x,y) \times SD(x) \times SD(y)$$

Volatility is equal to the square root of variance.

DWBH! ... continuation of previous slide:

Simple example of diversification using our formula:

Suppose you have two uncorrelated stocks , $X(\mu,\sigma)$ $X_1(0.02,0.03)$ and $X_2(0.04,0.05)$. If you are risk-adverse, you may want to put all of your money in stock X_1 and accept the lower 2% yield. But what if you split your portfolio 50/50, giving you a 3% yield? What would your risk be??

$V_1 = 0.0009$ and $V_2 = 0.0025$ and each alpha equals 1/2. Therefore

$V_{1,2} = 0.25 \text{ X } (0.0009 + 0.0025) = 0.00085$ and $0.00085^{1/2} = 0.0291$.

Therefore, by diversifying your portfolio you have raised your yield by 50% while lowering your risk.

DWBH! ... continuation of previous slide:

Coding the Covariance (prior 2 equations)

Help from David Coates '08

For the covariance part of the equation only,

```
for I = 1 to (n-1) do
  for J = (i+1) to n do

  COV(I,J) = CORREL(I,J)*SD(I)*SD(J);
  SUMCOV = SUMCOV + COV(I,J);

  end;
end;

SUMCOV = 2*SUMCOV;
```

and the weighted portfolio calculation would be the same except

```
WCOV(I,J) = a(I)*a(J)*CORREL(I,J)*SD(I)*SD(J);
```

$$\begin{bmatrix} S_1 & S_2 & S_3 & S_4 \end{bmatrix} \begin{bmatrix} 0 & C_{12} & C_{13} & C_{14} \\ 0 & 0 & C_{23} & C_{24} \\ 0 & 0 & 0 & C_{34} \\ 0 & 0 & 0 & 0 \end{bmatrix} \begin{bmatrix} S_1 \\ S_2 \\ S_3 \\ S_4 \end{bmatrix} \times 2$$

Memo slide for sticklers for accuracy (a desirable trait), those of you who want to work in finance, and you coders who own a laptop and want to retire before age 35 trading off of any beach with a wireless setup.