

# Demand System Asset Pricing

## Data Sources, Data Construction, and PS #1

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# Outline

- ▶ Data sources for for US equities.
- ▶ Data construction.
- ▶ Facts about holdings data and PS#1.
- ▶ Other sources of holdings data.

## Data sources US equities

- ▶ In KY19, we use the following data sources:
  - ▶ Prices and shares outstanding: CRSP.
  - ▶ Accounting data: Compustat.
  - ▶ Holdings data: 13-F filings accessed via Thomson-Reuters (S34).
- ▶ Alternative sources for 13-F filings:
  - ▶ Thomson Reuters Ownership.
  - ▶ FactSet Ownership (used in KRY21).

## Data construction: CRSP-Compustat merge

- ▶ `StocksMonthly.do` and `Stocks.do` of KY19 merge the CRSP and Compustat data.
- ▶ Standard steps:
  - ▶ Quarterly accounting flow variables are aggregated for four quarters.
  - ▶ All accounting variables are lagged for six months.
- ▶ To construct characteristics and a code to download all relevant files automatically, see <https://www.openassetpricing.com>.

## Data construction: Holdings data

- ▶ SEC Form 13F is the primary source: Quarterly stock holdings of institutions managing over \$100m.
- ▶ Several notes:
  - ▶ 13F data are at the level of the institution (e.g., Vanguard instead of the Vanguard Small Cap Value Index Fund).
  - ▶ The filings are due 45 days after the end of the quarter.
  - ▶ Those filings can be restated later in case the earlier filings contained mistakes or some holdings were marked as confidential.
  - ▶ Form 13F reports only long positions and not short positions.
  - ▶ Cash and bond positions are not reported.
- ▶ The data are merged on CUSIP with the CRSP-Compustat data.

## Data construction: Holdings data

- ▶ The KY19 file `Holdings.do` processes the holdings data:
  - ▶ We create a household sector whose holdings are given by the difference between shares outstanding and the total holdings by institutions.
  - ▶ The holdings of the household sector can be negative.
    - ▶ Set the households' holdings to zero.
    - ▶ Scale the holdings of institutions.
    - ▶ Mainardi (2022) makes a further adjustment for the number of shares shorted.

## Investor types

- ▶ Thomson-Reuters provides type codes.
- ▶ Unfortunately, those contain mistakes in S34 since the late nineties.
- ▶ We fix those in KY19 and assign institutions to:
  - ▶ Banks.
  - ▶ Insurance companies
  - ▶ Investment advisors.
  - ▶ Mutual funds.
  - ▶ Pension funds.
  - ▶ Other 13F institutions (e.g., endowments, foundations, and nonfinancial corporations).
- ▶ FactSet also provides consistent type codes, also identifying hedge funds.

## Investment universe

- ▶ Empirically, we find that investors hold few stocks and that this set is fairly stable over time.
- ▶ We construct the “investment universe,”  $\mathcal{N}_{it}$ , which are investor-level sets of stocks that the investor **can** hold, even though the actual weight may be zero in a given quarter.
- ▶ Stocks outside the investment universe,  $n \notin \mathcal{N}_{it}$ , always receive a weight of zero.
- ▶ To construct the investment universe, we include all stocks held in the current quarter and the previous  $k$  quarters.



## Facts about holdings: Persistence of holdings

AUM percentile	Previous quarters										
	1	2	3	4	5	6	7	8	9	10	11
1	82	85	86	88	89	90	91	92	93	93	94
2	85	87	89	91	92	92	93	94	94	95	95
3	85	88	89	90	91	92	93	93	94	94	95
4	85	87	89	90	91	92	92	93	93	94	94
5	85	87	89	90	90	91	92	92	93	93	94
6	85	87	88	89	90	91	92	92	93	93	94
7	84	86	88	89	90	91	91	92	92	93	93
8	84	87	88	90	90	91	92	92	93	93	94
9	87	89	90	91	92	93	93	94	94	94	95
10	92	93	94	95	95	96	96	96	97	97	97

# Facts about holdings

Period	Number of institutions	% of market held	Assets under management (\$ million)		Number of stocks held		Number of stocks in investment universe	
			Median	90th prctile	Median	90th prctile	Median	90th prctile
1980-'84	544	35	337	2,666	118	386	183	523
1985-'89	780	41	400	3,604	116	451	208	691
1990-'94	979	46	404	4,563	106	511	192	810
1995-'99	1,319	51	465	6,579	102	555	176	942
2000-'04	1,801	57	371	6,095	88	520	165	982
2005-'09	2,443	65	333	5,424	73	460	145	922
2010-'14	2,883	65	315	5,432	67	445	122	798
2015-'17	3,664	67	301	5,186	67	451	111	743

# Problem set #1

Questions to discuss:

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3. What explains the persistence in active positions?
4. What explains the heterogeneity in portfolios (both in the intensive and extensive margins)?

# Institutional holdings data

- ▶ Equity:
  - ▶ Mutual funds and ETFs: Morningstar and FactSet.
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  - ▶ Mutual funds and ETFs: Morningstar and FactSet.
  - ▶ Insurance companies: Schedule D (NAIC, SNL, AM Best).
  - ▶ Refinitiv's eMAXX combines various sources.

# International holdings data

- ▶ Securities Holdings Statistics:
  - ▶ Compiled by the ECB based on custodial records.
  - ▶ Securities-level data by country and sector.
- ▶ IMF Coordinated Investment Portfolio Statistics (CPIS).
  - ▶ Country-level cross-country holdings of short-term bonds, long-term bonds, and equity.
- ▶ Treasury International Capital (TIC) System
  - ▶ Domestic and foreign holdings of US assets.
  - ▶ US holdings of foreign assets.



## Household-level data

- ▶ Households are constructed as the residual of institutional holdings.
- ▶ In various countries, direct data on holdings are available.
  - ▶ US brokerage data (Barber and Odean 2000).
  - ▶ Statistics Sweden (Calvet et al. 2007).
  - ▶ Norwegian Central Securities Depository (Betermier et al. 2022).
  - ▶ Also Brazil, China, and India.
- ▶ These data can be used to unbundle the household sector and explore the implications of aggregation.
- ▶ More broadly, a more complete asset demand system features:
  - ▶ Households allocate capital directly and to institutions.
  - ▶ Institutions allocate capital to financial markets.
  - ▶ For example, Koijen and Yogo (2022, “Understanding the Ownership Structure of Corporate Bonds”).

# Summary

- ▶ In many markets, detailed data on holdings are available.
- ▶ Regulators or supervisors, typically have additional data that can potentially be accessed.
- ▶ Most of those markets have not yet been explored, which creates unique research opportunities.