

Gerry GarveyG

Systematic Active Equity

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BlackRock

Real economy portfolio

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Overview

- 2020 Disconnect of Economy and Equities: Mayers and Roll wrote about about this long ago
 - Conclusion: Even MSCI ACWI is not the true market portfolio
- What can we do about it?
 - V1: Don't expect too close of a connection
 - V2: try to make portfolios that get *closer* to the theoretical ideal!
- Useful attributes of REP portfolio
 - Doesn't look like standard factors (Fundamental index, Low Vol)
 - Plays tech in an novel way
 - Low emissions even though that wasn't the goal (the economy is greener than the stock market)

Origin:

- **GE on the Goodradigbee, 1994**



- **Fisher and Marshall (2011). Make extended IO table into a GE model that links shocks to rewards to different types of capital and labor**
 - Hey! Our investable universes only contains claims to a *subset* of the capital.

Our key raw input: IO table from BEA or OECD or WIOD

- Here is the coarsest US BEA table, 2019
- Existing finance research uses only the square portion with a naïve momentum thesis

Name	Agriculture, forestry	Mining	Utilities	Construction	Manufacturing	Wholesale trade	Retail trade	Transportation and	Information	Finance, insurance	Professional and	Educational serv	Arts, entertainm	Other services	Government
Agriculture, forestry, fishing, and hunting	\$ 114,769	\$ 191	...	\$ 3,432	\$ 322,670	\$ 1,774	\$ 5,259	\$ 199	...	\$ 17	\$ 5,402	\$ 255	\$ 10,129	\$ 330	\$ 8,980
Mining	\$ 2,544	\$ 58,999	\$ 40,944	\$ 27,940	\$ 371,488	\$ 26	\$ 5	\$ 234	\$ 933	\$ 62	\$ 2,038	\$ 439	\$ 1,573	\$ 689	\$ 39,181
Utilities	\$ 4,401	\$ 9,069	\$ 22,602	\$ 4,793	\$ 55,663	\$ 15,113	\$ 33,156	\$ 12,237	\$ 5,448	\$ 108,576	\$ 16,373	\$ 18,894	\$ 28,745	\$ 3,963	\$ 25,836
Construction	\$ 1,681	\$ 3,501	\$ 6,840	\$ 217	\$ 14,197	\$ 1,983	\$ 4,465	\$ 5,923	\$ 2,456	\$ 160,480	\$ 1,799	\$ 1,651	\$ 2,899	\$ 3,488	\$ 95,792
Manufacturing	\$ 110,824	\$ 87,229	\$ 24,462	\$ 992,230	\$ 2,498,644	\$ 92,558	\$ 98,575	\$ 144,775	\$ 120,386	\$ 114,226	\$ 210,934	\$ 265,246	\$ 147,831	\$ 78,423	\$ 525,874
Wholesale trade	\$ 1,486	\$ 184	\$ 1,111	\$ 62	\$ 25,085	\$ 44,649	\$ 19,245	\$ 217	\$ 2,155	\$ 7,402	\$ 228	\$ 360	\$ 133	\$ 22	\$ 43
Retail trade	\$ 196	\$ 109	\$ 2,342	\$ 14	\$ 272,840	\$ 729,681	\$ 298,744	\$ 6,473	\$ 9,297	\$ 64,563	\$ 2,955	\$ 1,632	\$ 275	\$ 23	\$ 426
Transportation and warehousing	\$ 661	\$ 2,968	\$ 10,538	\$ 1,153	\$ 54,383	\$ 81,713	\$ 76,317	\$ 148,148	\$ 21,570	\$ 43,612	\$ 64,799	\$ 22,669	\$ 10,327	\$ 5,323	\$ 49,523
Information	\$ 582	\$ 2,180	\$ 2,809	\$ 8,584	\$ 22,650	\$ 25,313	\$ 29,575	\$ 13,858	\$ 237,039	\$ 73,613	\$ 121,163	\$ 42,412	\$ 22,982	\$ 18,944	\$ 104,515
Finance, insurance, real estate, rental, and leasing	\$ 33,682	\$ 42,756	\$ 13,517	\$ 95,687	\$ 108,329	\$ 189,839	\$ 234,543	\$ 138,470	\$ 89,086	\$ 1,420,134	\$ 301,006	\$ 335,075	\$ 160,697	\$ 86,867	\$ 199,748
Professional and business services	\$ 3,767	\$ 59,519	\$ 29,368	\$ 87,133	\$ 373,668	\$ 312,972	\$ 243,546	\$ 102,899	\$ 264,047	\$ 629,777	\$ 703,354	\$ 311,162	\$ 203,010	\$ 99,658	\$ 286,681
Educational services, health care, and social assistance	\$ 18	...	\$ 230	\$ 10	\$ 146	\$ 2,808	\$ 8,556	\$ 341	\$ 363	\$ 39	\$ 1,738	\$ 43,675	\$ 2,469	\$ 4,822	\$ 35,765
Arts, entertainment, recreation, accommodation, and food services	\$ 574	\$ 725	\$ 2,312	\$ 1,087	\$ 12,127	\$ 10,619	\$ 9,930	\$ 21,627	\$ 47,953	\$ 88,963	\$ 84,293	\$ 59,965	\$ 41,678	\$ 8,661	\$ 25,811
Other services, except government	\$ 677	\$ 905	\$ 468	\$ 8,279	\$ 21,587	\$ 29,300	\$ 19,229	\$ 19,618	\$ 8,670	\$ 39,124	\$ 34,890	\$ 27,939	\$ 18,010	\$ 10,208	\$ 33,378
Government	\$ 17	\$ 6	\$ 2,857	\$ 5	\$ 4,698	\$ 14,559	\$ 7,147	\$ 12,233	\$ 2,863	\$ 18,019	\$ 9,499	\$ 8,833	\$ 6,529	\$ 2,454	\$ 9,717
Scrap, used and secondhand goods	\$ 150	\$ 198	\$ 8,957	\$ 3,465	\$ 48,092	...	\$ 463	\$ 13,068	\$ 335	\$ (39)	\$ 187	\$ 3,941	\$ 956	\$ 12,000	\$ (44)
Noncomparable imports and rest-of-the-world	\$ 1,221	\$ 2,034	\$ 945	\$ 2,285	\$ 19,955	\$ 6,164	\$ 5,029	\$ 21,568	\$ 10,370	\$ 47,356	\$ 8,382	\$ 986	\$ 3,410	\$ 539	\$ 12,334
Compensation of employees	\$ 57,671	\$ 86,582	\$ 88,212	\$ 992,431	\$ 1,131,337	\$ 598,603	\$ 650,475	\$ 408,642	\$ 399,645	\$ 1,019,438	\$ 1,969,015	\$ 1,515,143	\$ 544,608	\$ 336,541	\$ 2,086,153
Gross operating surplus	\$ 127,280	\$ 177,782	\$ 182,514	\$ 289,232	\$ 1,125,415	\$ 426,878	\$ 261,836	\$ 244,970	\$ 666,738	\$ 3,163,016	\$ 675,846	\$ 305,826	\$ 243,716	\$ 99,485	\$ 580,658
Total industry output	\$ 473,568	\$ 563,763	\$ 473,065	\$ 1,687,898	\$ 6,230,548	\$ 1,828,548	\$ 1,728,031	\$ 1,328,233	\$ 1,897,069	\$ 7,268,890	\$ 4,239,006	\$ 2,999,351	\$ 1,467,553	\$ 743,369	\$ 4,113,945

- Last three rows turn our focus to the division of surplus within the industry
- Inputs from other industries are just the embedded capital and labor plus inputs that they in turn source from others
- Green=dominated by listed firms, blue=quite well represented, black=very thinly represented

The table we use in practice US 2016 from WIO.org rolled up to seven sectors

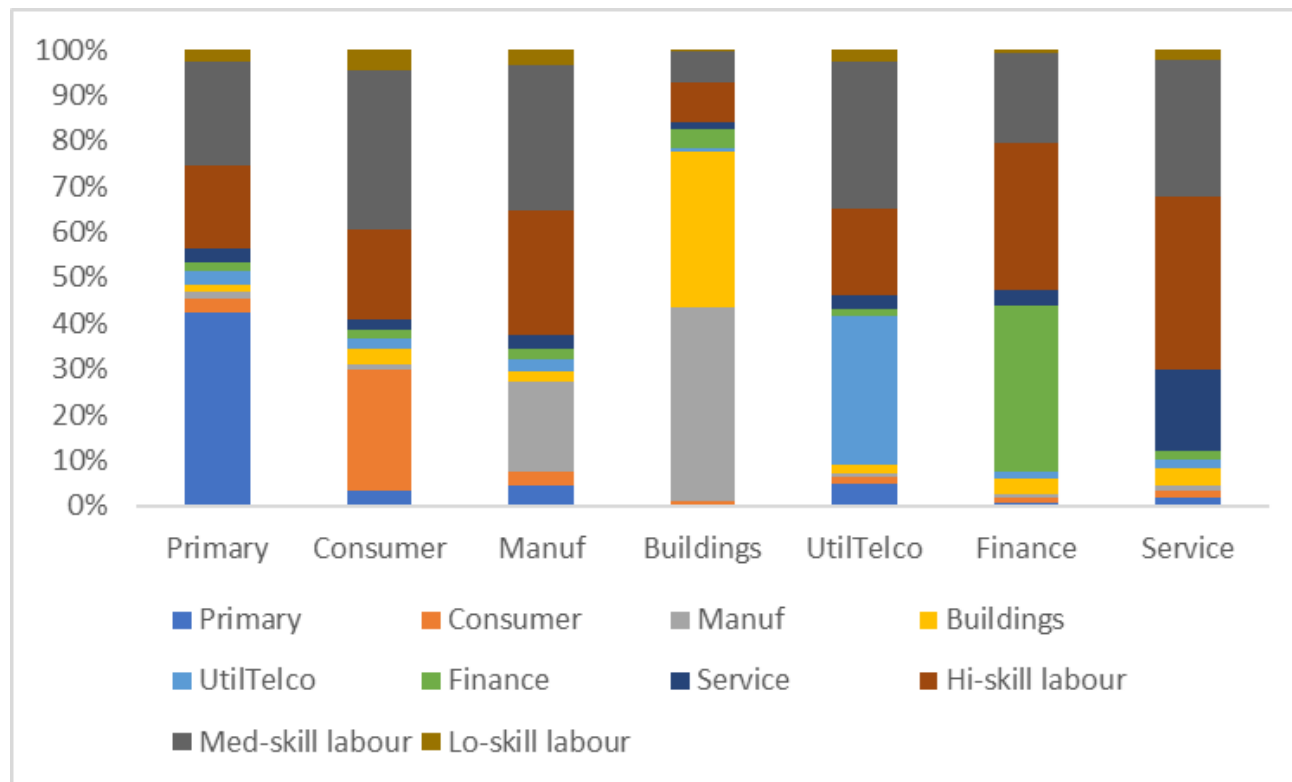
- Sectors have at least 20 listed firms in US allcap; also can be done for Japan and China
- Map directly into old-school SIC codes, GICS not so much (see appendix slide)

Sector	Buildings	Consumer	Finance	Manufacturing	Primary	Services	UtilTelco
Buildings	\$ 19,360	\$ 38,202	\$ 8,228	\$ 2,089,122	\$ 17,523	\$ 410,793	\$ 47,213
Consumer	\$ 117,878	\$ 724,598	\$ 23,921	\$ 244,429	\$ 49,300	\$ 147,574	\$ 67,878
Finance	\$ 26,668	\$ 69,593	\$ 692,591	\$ 253,567	\$ 32,039	\$ 1,628,817	\$ 92,185
Manufacturing	\$ 154,444	\$ 664,215	\$ 253,950	\$ 1,392,748	\$ 64,378	\$ 161,629	\$ 92,396
Primary	\$ 783,828	\$ 170,140	\$ 32,928	\$ 131,222	\$ 60,587	\$ 169,588	\$ 74,502
Services	\$ 68,437	\$ 93,949	\$ 21,532	\$ 273,042	\$ 37,647	\$ 814,408	\$ 494,879
UtilTelco	\$ 175,462	\$ 78,996	\$ 19,735	\$ 278,550	\$ 428,391	\$ 143,780	\$ 75,045
LAB_HS	\$ 658,608	\$ 1,190,001	\$ 484,813	\$ 719,349	\$ 412,507	\$ 1,791,699	\$ 608,532
LAB_MS	\$ 806,800	\$ 1,207,663	\$ 415,554	\$ 552,549	\$ 688,747	\$ 1,303,053	\$ 497,890
LAB_LS	\$ 93,811	\$ 264,994	\$ 77,194	\$ 35,477	\$ 55,227	\$ 69,727	\$ 60,253
Capital	\$ 657,559	\$ 1,535,965	\$ 278,189	\$ 993,685	\$ 295,611	\$ 1,503,015	\$ 655,283

- “LAB_XS” denotes educational level of labor: model assumes that these folks can cross industry boundaries.
- “Capital” is Gross Operating Surplus, analogous to operating income
- Sum of the LAB and Capital terms is Industry Value-Add, analogous to gross profits

The big pivot: Leontief Matrix

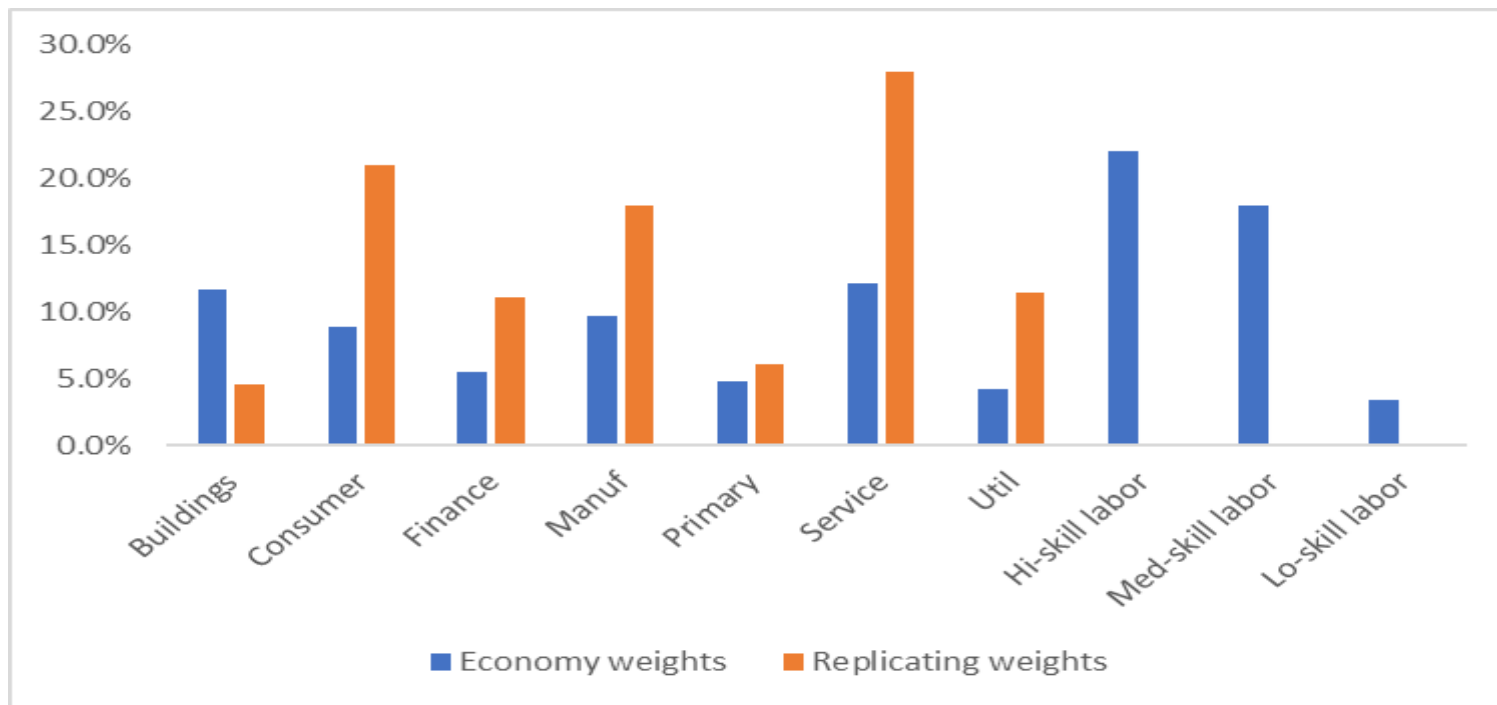
- IO tables show only direct, first-order input requirement; “Leontief inverse” sums up all direct and indirect input requirements
- Here’s the inputs required to produce a unit of output for each sector



- Industries with similar labor inputs effectively compete along this dimension

What REP does

- Think of economic dynamics as shocks to industries or some subset thereof.
- If we could pinpoint shocks we have thematic portfolios
- Here we try to be completely agnostic to shocks. Get unit exposure to them all. That's the equivalent of "Market Portfolio" in CAPM



SAE's experience

- **Used in globals since 2014**

- Ignores countries, so over-weights those with more service and consumer firms
- Cap-weighted within industry, to avoid a big “Fundamental Index” footprint
- If you go truly global (include EM),
 - Overweights are US, Mexico, Japan, Thailand
 - Underweights are Saudi, Australia, Brazil

Some names: Cheap expression with ETF's is GICS Staples + Tech

OVERWEIGHT

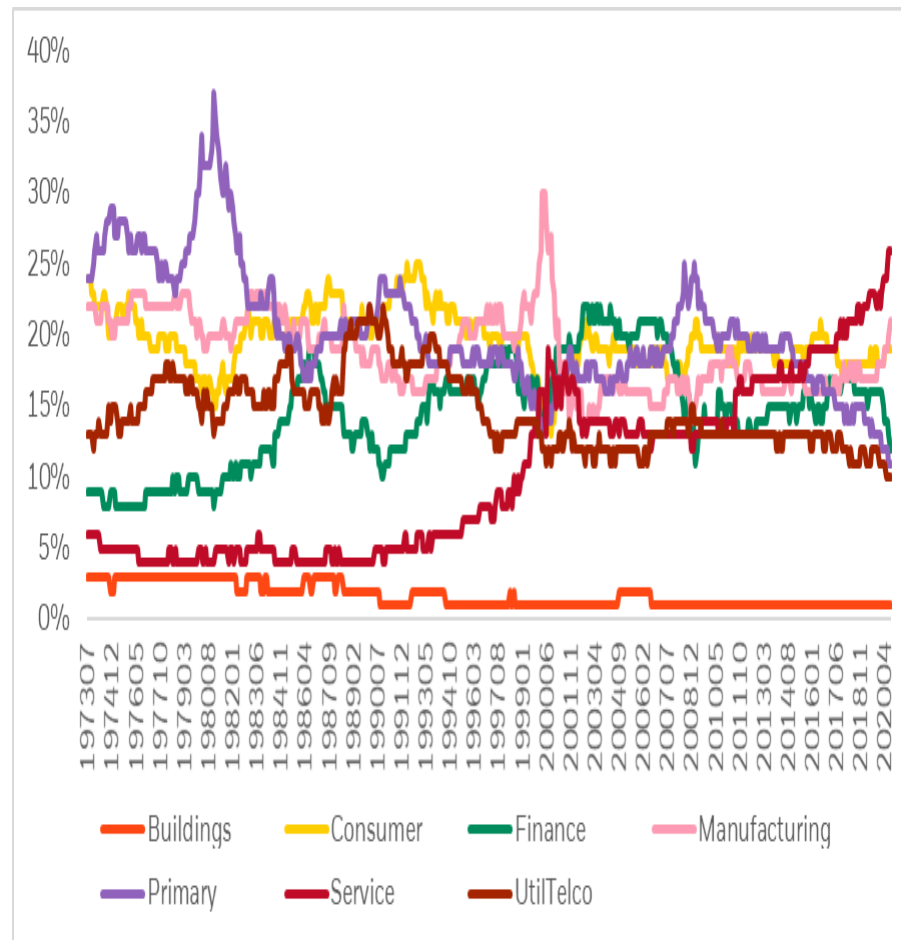
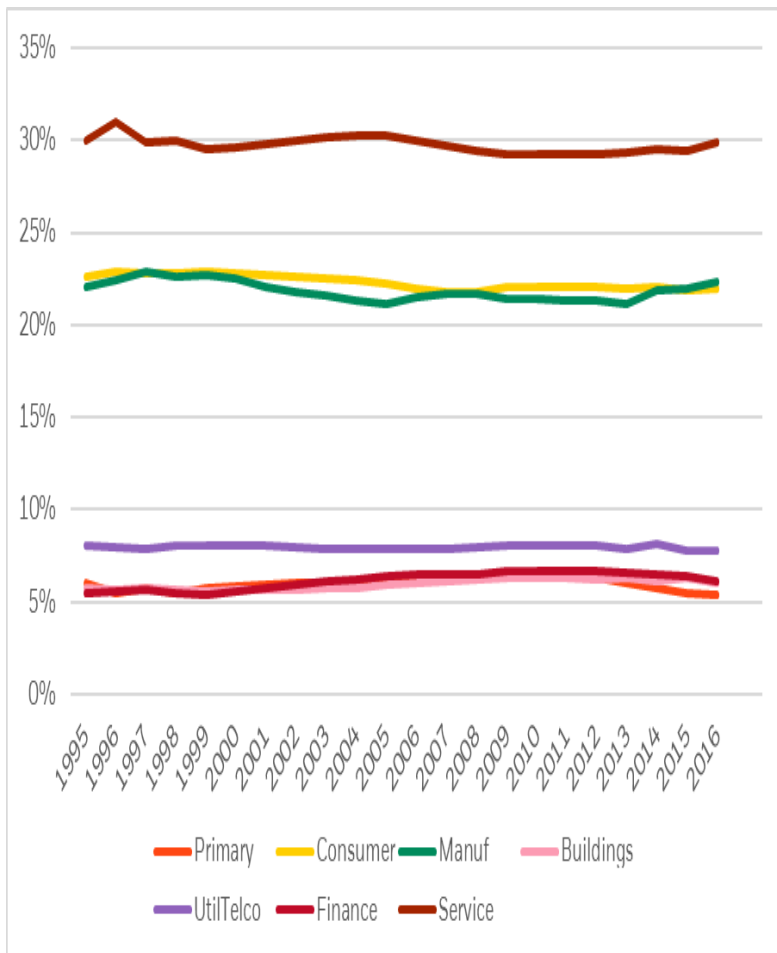
- Amazon
- Microsoft, Alphabet, Facebook
- Walmart, Home Depot, Kering, Diageo
- Altria, BAT

(REP has a very low carbon footprint, but otherwise quite ESG-agnostic)

UNDERWEIGHT

- Saudi Aramco, Exxon
- JP Morgan, Wells Fargo
- Visa, Mastercard
- Roche, Merck, Pfizer
- AT&T, Verizon

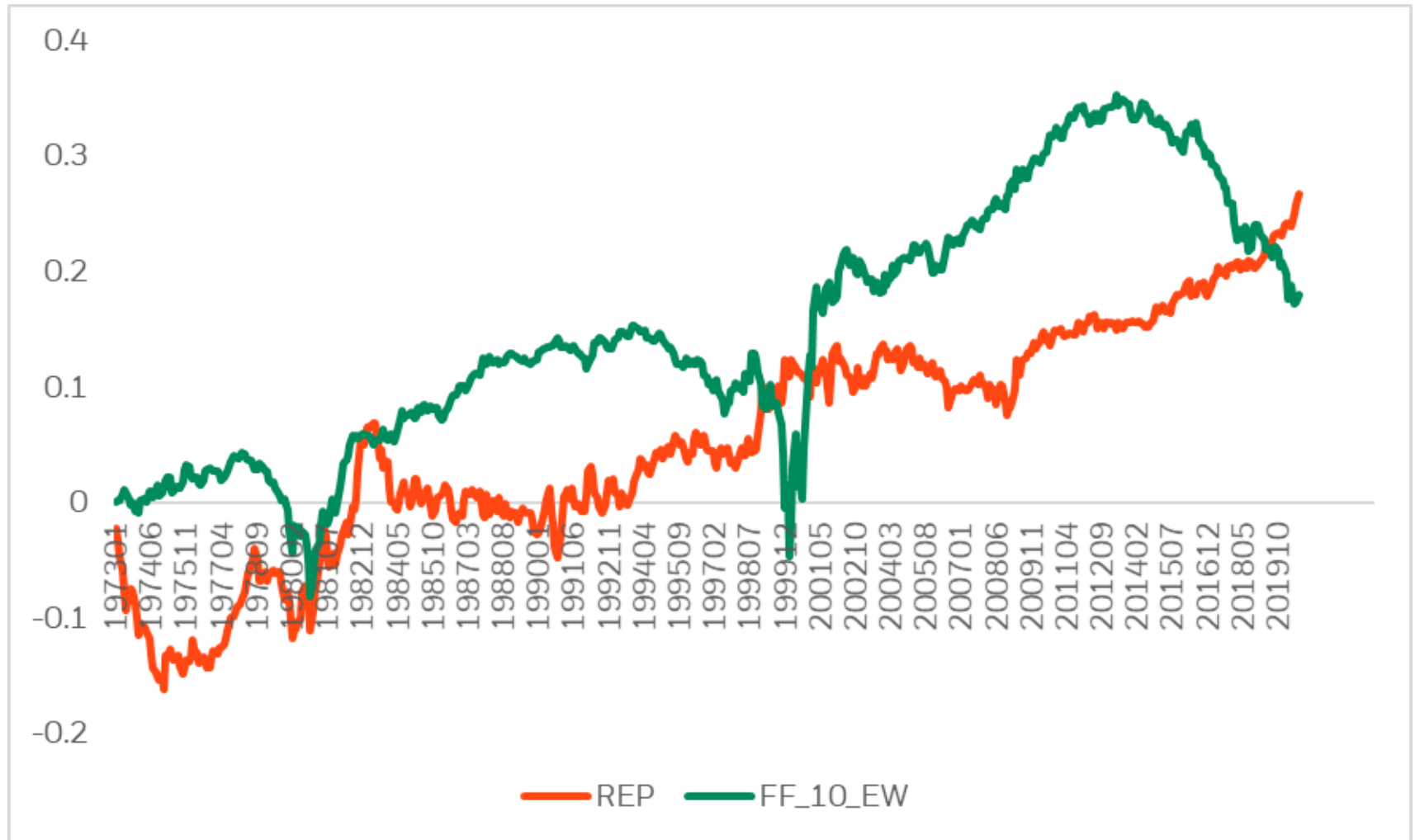
Some US results in academesse (using FF data so anyone can replicate)



Old school performance regressions

Variable	Full Sample (starts 1973)	WIO data available (starts 1995)	Post Research (starts 2014)
Alpha	0.000715 (2.33)	0.00101 (2.76)	0.00823 (2.21)
MKT	0.0013 (0.187)	0.032 (1.03)	0.038 (0.98)
SMB	0.11 (10.31)	0.038 (2.89)	-0.0133 (1.81)
HML	-0.034 (2.51)	-0.019 (1.23)	-0.028 (2.76)
RMW	0.017 (1.20)	-0.012 (0.72)	0.118 (4.41)
CMA	-0.11 (5.15)	-0.116 (5.31)	-0.112 (3.78)
Adj R2	27%	21%	36%

Is it just mean-reversion in weights? Here is EW 10 sectors, cap weight within sectors



Next steps

- **Better ancillaries? Current ones are just ok**
 - REP's dividends or earnings are only a bit more correlated with one-year macro (GDP, consumption).
 - Active positions quite strongly forecast increases in book (retained earnings plus net issuance plus IPOs)
- **Multi-asset**
 - How to add PE? The appeal is obvious...our biggest weakness especially ex-US is thinness of key basket like services
 - How to deal with country in regional applications
 - Our global version ignores country except via risk model
 - Can we use fixed income to represent countries?

Appendix 1: REP vs GICS sectors

- R_Buildings
 - A slice of Financial
 - Construction slice of Industrials
- R_Consumer
 - Staples, some Discretionary
 - Also some Industrial and Tech
- R_Finance
 - Similar to MSCI
- R_Manufacturing
 - Industrials, Tech, Materials
 - Discretionary too, e.g. auto parts
- R_Primary
 - Energy plus Materials
 - Some EM Health Care is basic chemicals
- R_Service
 - Mix of Tech, Discretionary
 - Some Industrials are Bus Services
- R_Util Telco

