Online appendix to "Understanding Weak Capital Investment: the Role of Market Concentration and Intangibles"[*]

Nicolas Crouzet and Janice Eberly

This version: December 14, 2018

We report results of the analysis of section 4.2.1 of the paper, on markups, with markup measures adjusted for the fact that `xsga` contains variable input costs potentially complementary with intangible capital.

Figure 1 and tables 1 and 3 report results for the following markup measure:

$$\mu_{Lerner} = \frac{1}{1 - \frac{\texttt{oibdp}}{\texttt{sale}}} = \frac{\texttt{sale}}{\texttt{cogs} + \texttt{xsga}},$$

where the second equality uses the fact that $\texttt{oibdp} = \texttt{sale} - \texttt{cogs} - \texttt{xsga}$. This is the profit-margin based measure of markups discussed in the note of Gutierrez & Philippon (2018).

Figure 2 and tables 2 and 4 report results from a similar markup measure, but were $R\&D$ expenditures, `xrd` (which may not primarily represent variable inputs) are substracted from `xsga`. This follows the treatment of SG&A in Peters and Taylor (2017), appendix B.1.

|	Dependent variable : log(sale/(xsga+cogs))			
	Consumer	Manufacturing	High-tech	Healthcare
Compustat intangible share s_t (OLS)	-0.013	0.045^{***}	0.180^{***}	0.135^{***}
	(-1.53)	(3.18)	(7.88)	(4.46)
Compustat intangible share s_t (IV)	-0.026^{***}	0.072	0.282^{***}	0.309^{***}
	(-3.36)	(0.84)	(5.85)	(20.85)
First-stage F-stat	802.12	10.47	89.31	617.89
Observations	56	504	168	112
Industry f.e.	Yes	Yes	Yes	Yes

Table 1: Industry-level relationship between markups and the share of intangible assets, with markups for SG&A. The dependent variable is the log of the industry-wide average markup, defined as the ratio `sale/(cogs + xsga)`, adjusted to match the Hall (2018) industry averages. Results are reported separately for 4 broad group of sectors. All regressions contain industry effects. The first panel reports the simple OLS coefficient, while the second panel report coefficients when the Compustat intangible share is instrumented using the BEA measure of intangibles. The t-statistics reported in parentheses are computed using heteroskedasticity-robust standard errors. Cragg-Donald F statistic reported for the first stage. * : $p < 0.10$, ** : $p < 0.05$, *** : $p < 0.01$.

	Dependent variable : log(sale/(xsga+cogs-xrd))			
	Consumer	Manufacturing	High-tech	Healthcare
Compustat intangible share s_t (OLS)	-0.043^{***}	0.027	0.245^{***}	0.268^{***}
	(-3.73)	(1.86)	(6.59)	(5.80)
Compustat intangible share s_t (IV)	-0.061^{***}	0.178	0.442^{***}	0.565^{***}
	(-6.97)	(1.81)	(5.50)	(24.19)
First-stage F-stat	802.12	10.47	89.31	617.89
Observations	56	504	168	112
Industry f.e.	Yes	Yes	Yes	Yes

Table 2: Industry-level relationship between markups and the share of intangible assets, with markups for SG&A, but removing R&D. The dependent variable is the log of the industry-wide average markup, defined as the ratio `sale/(cogs + xsga − xrd)`, adjusted to match the Hall (2018) industry averages. Everything is the same as in table 1 otherwise. * : $p < 0.10$, ** : $p < 0.05$, *** : $p < 0.01$.
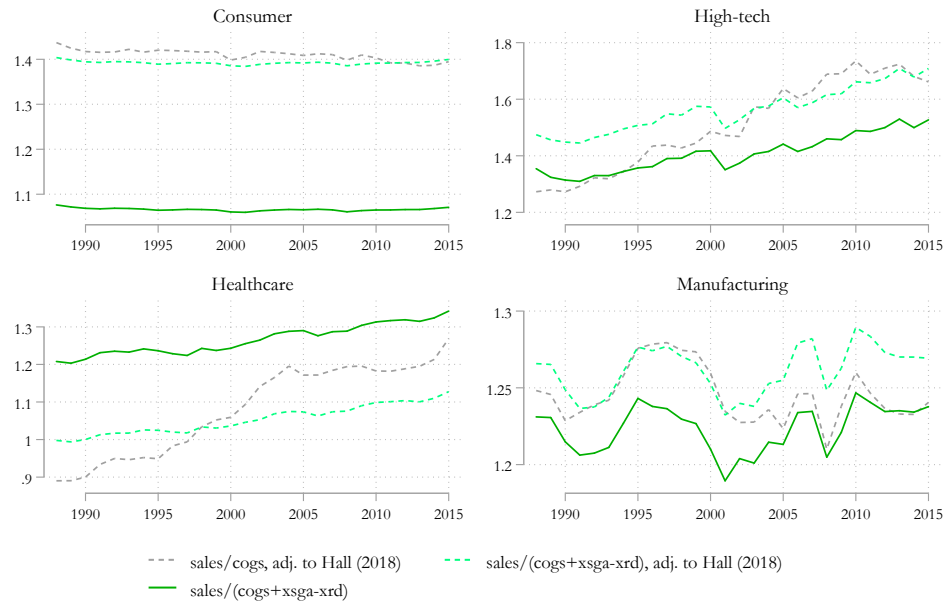
(a)
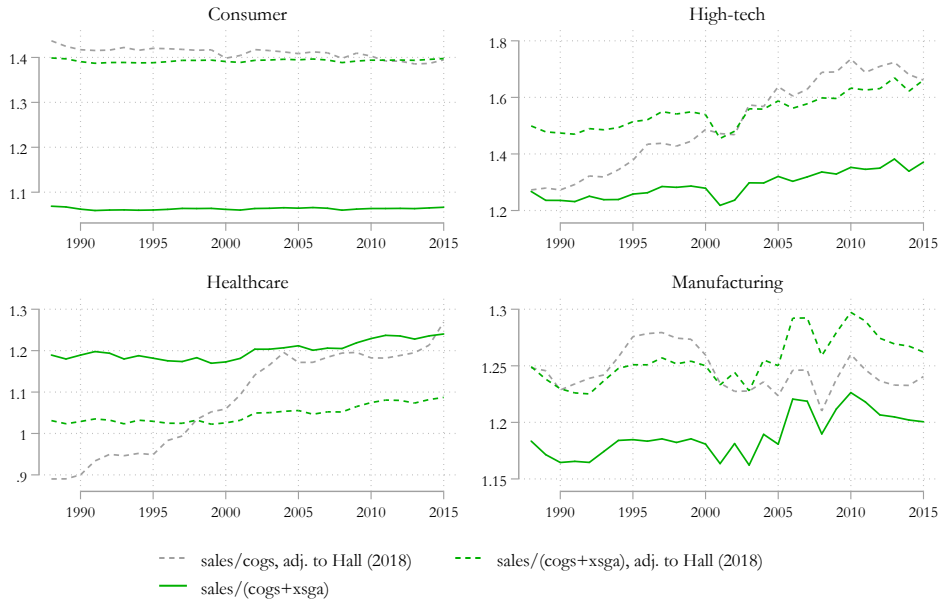
(b)

Figure 1: Trends in markups, adjusted and unadjusted for SG&A. The grey line is identical to figures 10a and 10b of the paper; it reports weighted averages of the ratio `sale/cogs`, adjusted to match the Hall (2018) averages at the industry level. The green lines report the same averages, for the ratio `sale/(cogs + xsga)`. All estimates are constructed at the KLEMS industry level first, then averaged across industries using their share of nominal value added in 2001. At the industry level, the markup ratios are averaged using firm-level sales in that year as weights. Markups are winsorized at the 1st and 99th percentiles, by year. Finally, the agricultural and mining sectors are dropped, as markup measures obtained using the KLEMS data are negative in both cases.

3

(a)

(b)

Figure 2: Trends in markups, adjusted and unadjusted for SG&A, but removing R&D from SG&A. The grey line is identical to figure 10a and 10b of the paper; it reports weighted averages of the ratio `sale`/`cogs`, adjusted to match the Hall (2018) averages at the industry level. The green lines report the same averages, for the ratio `sale`/(`cogs` + `xsga` − `xrd`). Everything is the same as in figures 2a and 2b otherwise.

	Dependent variable : log(sale/(xsga+cogs))			
Panel A	Cross-sectional (between) regressions			
	Consumer	Manufacturing	High-tech	Healthcare
Compustat intangible share $s_{j,t}$	0.002	0.040***	0.055***	0.051**
(OLS)	(0.14)	(3.64)	(4.55)	(2.12)
Compustat intangible share $s_{j,t}$	−0.248***	−0.109**	−0.125**	0.025***
(IV)	(−3.99)	(−2.47)	(2.29)	(5.92)
First-stage F stat	71.5	216.4	49.8	86.0
Observations	8027	24436	19730	10296
Firms	646	1726	1718	878
Firm-level controls	Yes	Yes	Yes	Yes
Standard error clustering	Industry-year and firm	Industry-year and firm	Industry-year and firm	Industry-year and firm
Industry-year f.e.	Yes	Yes	Yes	Yes
Firm f.e.	No	No	No	No
Panel B	Panel (within) regressions			
	Consumer	Manufacturing	High-tech	Healthcare
Compustat intangible share $s_{j,t}$	0.020***	0.033***	0.014	0.069***
(OLS)	(3.74)	(3.60)	(1.30)	(2.86)
Compustat intangible share $s_{j,t}$	−0.302***	−0.553**	−0.160*	0.627**
(IV)	(−2.80)	(1.99)	(−1.82)	(2.06)
First-stage F stat	13.7	16.1	29.5	11.1
Observations	8027	24436	19730	10296
Firms	646	1726	1718	878
Firm-level controls	Yes (excl. age)	Yes (excl. age)	Yes (excl. age)	Yes (excl. age)
Standard error clustering	Industry-year and firm	Industry-year and firm	Industry-year and firm	Industry-year and firm
Industry-year f.e.	Yes	Yes	Yes	Yes
Firm f.e.	Yes	Yes	Yes	Yes

Table 3: Firm-level relationship between intangibles and markups. The dependent variable is $\log(\texttt{sale}/(\texttt{cogs} + \texttt{xsga}))$. Panel A reports results from specifications without firm fixed effects, while panel B reports results from specifications with firm fixed effects. The Compustat intangible share is $\texttt{intan}/(\texttt{ppegt} + \texttt{intan})$. The instruments in the IV specifications are either the ratio of capitalized R&D expenditures to capital (excluding balance sheet intangibles), $\mathbf{k}_{know}/(\mathbf{k}_{know} + \mathbf{k}_{org} + \texttt{ppegt})$, or the ratio of (a fraction of) capitalized SG&A expenditures to capital, $\mathbf{k}_{org}/(\mathbf{k}_{know} + \mathbf{k}_{org} + \texttt{ppegt})$, or both. The variables $\mathbf{k}_{know}$ and $\mathbf{k}_{org}$ are obtained from **?**. All dependent variables are measured at the beginning of the observation year. Firm controls are: size ($log(\texttt{ppegt})$), age (years since first appearance in CRSP), leverage ($(\texttt{dlc+dltt})/\texttt{at}$), and cash flow to assets ($\texttt{ebitda}/\texttt{at}$). Kleibergen-Paap (KP) Wald F statistics are reported for the IV specifications. The excluded instruments (the Peters-Taylor intangible shares) are selected according to the following criterion: if the KP statistic is higher than the Stock-Yogo critical values for 15% maximal IV size, keep both; otherwise, keep the one with the highest KP statistics. This criterion selects both the SG&A and R&D share for the High-tech and Manufacturing sector, and only the SG&A share for Consumer and Healthcare sectors. $*: p < 0.10$, $**: p < 0.05$, $***: p < 0.01$.

	Dependent variable : log(sale/(xsga+cogs-xrd))			
Panel A	**Cross-sectional (between) regressions**			
	Consumer	Manufacturing	High-tech	Healthcare
Compustat intangible share $s_{j,t}$	−0.007	0.020[***]	0.043[***]	0.159[***]
(OLS)	(−0.50)	(1.58)	(2.78)	(3.21)
Compustat intangible share $s_{j,t}$	−0.342[***]	−0.153[**]	−0.012	0.695[***]
(IV)	(−4.11)	(−2.68)	(1.76)	(3.37)
First-stage F stat	77.0	202.5	42.5	79.9
Observations	8027	24436	19730	10296
Firms	646	1726	1718	878
Firm-level controls	Yes	Yes	Yes	Yes
Standard error clustering	Industry-year and firm	Industry-year and firm	Industry-year and firm	Industry-year and firm
Industry-year f.e.	Yes	Yes	Yes	Yes
Firm f.e.	No	No	No	No
Panel B	**Panel (within) regressions**			
	Consumer	Manufacturing	High-tech	Healthcare
Compustat intangible share $s_{j,t}$	0.018[***]	0.026[***]	0.019	0.059[***]
(OLS)	(3.10)	(2.93)	(1.52)	(1.56)
Compustat intangible share $s_{j,t}$	−0.267[***]	−0.585[**]	0.192[*]	1.192[**]
(IV)	(−2.27)	(−2.13)	(1.89)	(2.24)
First-stage F stat	11.7	19.9	32.5	10.6
Observations	8027	24436	19730	10296
Firms	646	1726	1718	878
Firm-level controls	Yes (excl. age)	Yes (excl. age)	Yes (excl. age)	Yes (excl. age)
Standard error clustering	Industry-year and firm	Industry-year and firm	Industry-year and firm	Industry-year and firm
Industry-year f.e.	Yes	Yes	Yes	Yes
Firm f.e.	Yes	Yes	Yes	Yes

Table 4: Firm-level relationship between intangibles and markups. The dependent variable is $\log\left(\text{sale}/(\text{cogs} + \text{xsga} - \text{xrd})\right)$. Otherwise, things are the same as in table 3. * : $p < 0.10$, ** : $p < 0.05$, *** : $p < 0.01$.
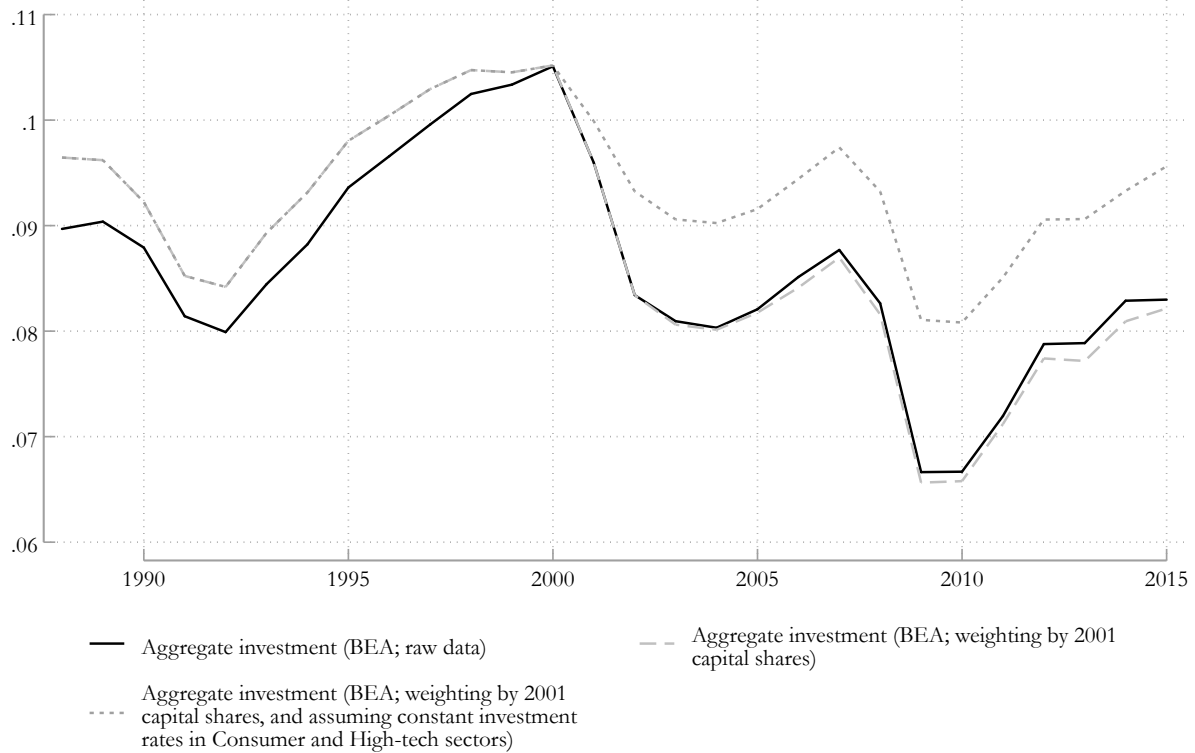
Figure 3: Actual and counterfactual investment rates. The data are from the BEA fixed asset tables. The black line reports the aggregate investment rate (it differs slightly from figures in the main text because that figure weights KLEMS sectors by their share of value added; this figure effectively weighs them by their share of capital). The dashed grey line represents the aggregate investment rate, keeping the composition of the capital stock between KLEMS industries fixed to 2001. Finally, the dashed blue line represents the aggregate investment rate, keeping the composition of the capital stock fixed to 2001, and assuming that KLEMS industries in the Consumer and High-tech groups had kept investing at the same rate as in 2001.

Sector (4-sector classification)	Share of value added (2001)	Sector (12-sector classification)	Share of value added (2001)	Subsectors	Share of value added (2001)	BEA sector code	KLEMS/BLS sector code	Underlying NAICS 2D/3D sectors in Compustat
Consumer	0.170	Wholesale & Retail trade	0.156	Retail Trade	0.085	44RT	44	44
				Wholesale Trade	0.071	4200	42	42
		Agriculture, Forestry, Fishing and Hunting	0.014	Crop & Animal Production (Farms)	0.014	110C	111,112	111 to 112
High-tech	0.097	IT & software	0.063	Computer and Electronic Products	0.024	3340	334	334
				Publishing industries, except internet (includes software)	0.017	5110	511	511
				Computer Systems Design and Related Services	0.017	5415	5415	5415
				Data processing, internet publishing, and other information services	0.006	5140	518,519	518 to 519
		Telecoms & Broadcasting	0.034	Broadcasting and telecommunications	0.026	5130	515,517	515 to 517
				Motion picture and sound recording industries	0.009	5120	512	512
Healthcare	0.089	Healthcare	0.089	Ambulatory Health Care Services	0.040	6210	621	621
				Chemical Products	0.027	3250	325	325
				Hospitals and Nursing and Residential Care Facilities	0.013	622H and 6230	622,623	622 to 623
				Miscellaneous Manufacturing	0.008	3390	339	339
Manufacturing	0.187	Manufacturing	0.146	Transportation Equipment	0.028	336M and 336O	336	336
				Food and Beverage and Tobacco Products	0.023	311A	311,312	311 to 312
				Fabricated Metal Products	0.016	3320	332	332
				Machinery	0.015	3330	333	333
				Petroleum and Coal Products	0.010	3240	324	324
				Plastics and Rubber Products	0.009	3260	326	326
				Paper Products	0.008	3220	322	322
				Electrical Equipment, Appliances, and Components	0.006	3350	335	335
				Nonmetallic Mineral Products	0.006	3270	327	327
				Primary Metal Products	0.006	3310	331	331
				Printing and Related Support Activities	0.006	3230	323	323
				Furniture and Related Products	0.004	3370	337	337
				Wood Products	0.004	3210	321	321
				Textile Mills and Textile Product Mills	0.004	313T	313,314	313 to 314
				Apparel and Leather and Applied Products	0.003	315A	315,316	315 to 316
		Utilities	0.026	Utilities	0.026	2200	22	221
		Mining and Oil & Gas	0.016	Oil and Gas Extraction	0.010	2110	211	211
				Mining, except Oil and Gas	0.003	2120	212	212
				Support Activities for Mining	0.003	2130	213	213

Table 5: Industry classification. We aggregate the NAICS 2 and 3-digit classification in order to be use both the BEA fixed asset tables for measuring the intangible capital stock, and the KLEMS/BLS data for measuring markups and productivity. Some BEA and KLEMS sectors are dropped for lack of data in Compustat; see table 7 for a list of those sectors.

Sector (4-sector classification)	Share of value added (2001)	Sector (12-sector classification)	Share of value added (2001)	Subsectors	Share of value added (2001)	BEA sector code	KLEMS/BLS sector code	Underlying NAICS 2D/3D sectors in Compustat
				Miscellaneous Professional, Scientific, and Technical Services	0.061	5412	5412-5414,5416-5419	5412 to 5414 and 5416 to 5419
				Administrative and Support Services	0.038	5610	561	561
		Other (mostly services)	0.169	Other services except Government	0.027	8100	81	81
				Food Services and Drinking Places	0.022	7220	722	722
				Accommodation	0.010	7210	721	721
				Amusements, Gambling, and Recreation Industries	0.005	7130	713	713
				Waste Management and Remediation Services	0.004	5620	562	562
Other	0.456			Educational Services	0.003	6100	61	61
				Construction	0.070	2300	23	23
		Construction, real estate, and leasing	0.137	Real Estate	0.046	5310	531	531
				Rental and Leasing Services and Lessors of Intangible Assets	0.021	5320	532,533	532 to 533
				Federal Reserve Banks, Credit Intermediation, and Related Activities	0.051	5210 and 5220	521,522	521 to 522
		Finance and insurance	0.113	Insurance Carriers and Related Activities	0.036	5240	524	524
				Securities, Commodity Contracts, and Investments	0.026	5230	523	523
				Truck Transportation	0.014	4840	484	484
				Other Transportation and Support Activities	0.010	487S	487,488,492	487 to 488
		Transportation and Warehousing	0.036	Air Transportation	0.005	4810	481	481
				Rail Transportation	0.003	4820	482	482
				Pipeline Transportation	0.002	4860	486	486
				Water Transportation	0.001	4830	483	483

Table 6: Industry classification (continued). We aggregate the NAICS 2 and 3-digit classification in order to be use both the BEA fixed asset tables for measuring the intangible capital stock, and the KLEMS/BLS data for measuring markups and productivity. Some BEA and KLEMS sectors are dropped for lack of data in Compustat; see table 7 for a list of those sectors.

BEA name	BEA code	KLEMS/BLS code	KLEMS/BLS name	Underlying NAICS 2D/3D sectors	Reason for exclusion
Forestry, fishing, and related activities	113F	113-115	Forestry, Fishing, and Related Activities	113 to 115	Not enough Compustat observations
Transit and ground passenger transportation	4850	485	Transit and Ground Passenger Transportation	485	Not enough Compustat observations
Warehousing and storage	4930	493	Warehousing and Storage	493	Not enough Compustat observations
Funds, trusts, and other financial vehicles	5250	525	Funds, Trusts, and Other Financial Vehicles	525	Most Compustat observations have no ppegt; most non-firm entities (REITS, etc).
Legal services	5411	5411	Legal Services	5411	Not enough Compustat observations
Management of companies and enterprises	5500	55	Management of Companies and Enterprises	55	Not enough Compustat observations
Social assistance	6240	624	Social Assistance	624	Not enough Compustat observations
Performing arts, spectator sports, museums, and related activities	711A	711,712	Performing Arts, Spectator Sports, Museums, and Related Activities	711 to 712	Not enough Compustat observations

Table 7: BEA and BLS industries excluded from the analysis.