

The Cyclical Behavior of the Price-Cost Markup Supplemental Appendix

Christopher J. Nekarda
Federal Reserve Board of Governors

Valerie A. Ramey
University of California, San Diego
and NBER

July 2009

The views in this paper are those of the authors and do not necessarily represent the views or policies of the Board of Governors of the Federal Reserve System or its staff. We are grateful to Garey Ramey, Davide Debortoli, and Robert Hall for helpful comments. Valerie Ramey gratefully acknowledges financial support from National Science Foundation grant SES-0617219 through the National Bureau of Economic Research.

Appendix C

Supplemental Appendix

This supplemental appendix provides detailed correspondences between the Bureau of Economic Analysis (BEA) benchmark input-output (IO) tables at various aggregations and years and the 1987 4-digit Standard Industrial Classification (SIC) codes used in the National Bureau of Economic Research (NBER)–Center for Economic Studies (CES) Manufacturing Industry Database (MID). The tables are also available in spreadsheet form (comma separated values) on the authors’ web sites.

We develop a correspondence between the 6-digit IO code–based IO data and the 4-digit SIC code–based MID data. The ultimate correspondence is between 4-digit IO and 4-digit SIC codes, but aggregation is required in both data sets to achieve a one-to-one correspondence. The merged database contains 272 industries at the 4-digit SIC level. The tables below provide details of the aggregation and the final correspondence.

Combined IO Codes

To create a complete correspondence, we occasionally need to assign a 6-digit IO code to a different 4-digit IO code for aggregation. For example, in the 1967 IO table, IO codes 170200 (“felt goods, n.e.c.”), 170300 (“lace goods”), 170400 (“padding & upholstery filling”), and so forth are assigned to 4-digit IO code 1710 (“textile goods, n.e.c.”) for final aggregation. This is required because no such industries existed at the 4-digit SIC level.

The tables below report which 6-digit IO codes are assigned to which 4-digit IO codes before aggregating to the 4-digit IO level. This assignment changes for each benchmark IO table.

1963 and 1967		1972		1977	
<i>Dest.</i>	<i>Source</i>	<i>Dest.</i>	<i>Source</i>	<i>Dest.</i>	<i>Source</i>
1710	170200	1710	170200	1710	170300
1710	170300	1710	170300	1710	170400
1710	170400	1710	170400	1710	170500
1710	170500	1710	170500	2408	240200
1710	170800	2408	240200	2408	240300
2408	240200	2408	240300	2408	240600
2408	240300	2408	240600	3206	361800
2408	240600	3206	361800	3805	380200
3206	361800	3805	380200	3805	380300
3805	380200	3805	380300	5308	530600
3805	380300	5104	510200	5407	540600

1963 and 1967		1972		1977	
<i>Dest.</i>	<i>Source</i>	<i>Dest.</i>	<i>Source</i>	<i>Dest.</i>	<i>Source</i>
4211	420600	5308	530600	6210	630100
4211	420900	5407	540600	6412	640600
5104	510200	6210	630100	6412	640700
5308	530600	6412	640600		
5407	540600	6412	640700		
6004	600300				
6103	610400				
6210	630100				
6412	640600				
6412	640700				

1982		1987 and 1992	
<i>Dest.</i>	<i>Source</i>	<i>Dest.</i>	<i>Source</i>
1710	170200	1710	171100
1710	170300	4904	470405
1710	170400	4704	470500
1710	170500	4907	490800
2408	240200	5000	500100
2408	240300	5000	500200
2408	240602	5103	500300
3206	361800	5000	500400
3805	380200	5604	560500
3805	380300	5805	580600
5308	530600	5805	580700
5407	540600	5803	620800
6210	630100	5301	621100
6412	640600	6210	620102
6412	640701	6412	640700
6412	640702		

Combined SIC Codes

Some SIC codes also require combination. This aggregation occurs mostly at the 3-digit SIC level, which roughly corresponds to the 4-digit IO level, but it is ultimately tailored to preserve the best correspondence with the IO data.

The table below shows which 4-digit SIC codes are combined into a single sector. The combined value of the sectors in the source column is assigned to the SIC code listed in the destination column.

<i>Dest.</i>	<i>Source</i>
2011	2011, 2013, 2015
2037	2037, 2038
2041	2041, 2043, 2045
2047	2047, 2048
2051	2051, 2052, 2053
2061	2061, 2062, 2063
2064	2064, 2066, 2067, 2068
2082	2082, 2083, 2084, 2085
2096	2096, 2099
2111	2111, 2121, 2131
2221	2221, 2211, 2231
2251	2251, 2252
2253	2253, 2254, 2259
2257	2257, 2258
2269	2269, 2261, 2262, 2281, 2282
2299	2299, 2297
2311	2311, 2321, 2322, 2323, 2325, 2326, 2329, 2331, 2335, 2337, 2339, 2341, 2342, 2353, 2361, 2369, 2371, 2381, 2384, 2385, 2386, 2387, 2389
2393	2393, 2394, 2395, 2396, 2397, 2399
2431	2431, 2434
2435	2435, 2436
2439	2439, 2451, 2452
2441	2441, 2449
2448	2448, 2493, 2499
2511	2511, 2517, 2519
2621	2621, 2631
2652	2652, 2653, 2655, 2656, 2657
2671	2671, 2672, 2673, 2674, 2675, 2678, 2679
2731	2731, 2732
2752	2752, 2754, 2759
2761	2761, 2782
2789	2789, 2791, 2796
2812	2812, 2813, 2816, 2865, 2869
2819	2819, 3334
2833	2833, 2834, 2835, 2836
2841	2841, 2842, 2843
2861	2861, 2891, 2892, 2893, 2895, 2899
2873	2873, 2874, 2875
2911	2911, 2992, 2999

<i>Dest.</i>	<i>Source</i>
3061	3061, 3069
3081	3081, 3082, 3083, 3084, 3085, 3086, 3087, 3088, 3089
3142	3142, 3143, 3144, 3149
3151	3151, 3161, 3171, 3172, 3199
3211	3211, 3229, 3231
3262	3262, 3263
3312	3312, 3313, 3315, 3316, 3317
3321	3321, 3322, 3324, 3325
3353	3353, 3354, 3355
3363	3363, 3365
3364	3364, 3369
3398	3398, 3399
3423	3423, 3425
3448	3448, 3449
3451	3451, 3452
3465	3465, 3466, 3469
3471	3471, 3479
3491	3491, 3492, 3494, 3498
3495	3495, 3496
3523	3523, 3524
3544	3544, 3545
3546	3546, 3547, 3548, 3549
3561	3561, 3563
3566	3566, 3568
3569	3569, 3565
3571	3571, 3572, 3575, 3577, 3578
3592	3592, 3593, 3594, 3599
3643	3643, 3644
3645	3645, 3646, 3647, 3648
3663	3663, 3669
3672	3672, 3675, 3676, 3677, 3678, 3679
3695	3695, 3699
3711	3711, 3714
3716	3716, 3792
3724	3724, 3764
3728	3728, 3769
3821	3821, 3826, 3827
3823	3823, 3824, 3829
3911	3911, 3914, 3915, 3961
3942	3942, 3944

<i>Dest.</i>	<i>Source</i>
3951	3951, 3952, 3953, 3955
3999	3999, 3965

Correspondence between IO and SIC Codes

The table below lists the complete correspondence between 4-digit IO codes and 4-digit SIC codes. The codes used in this table reflect the assignments and combinations described in the previous two sections.

<i>IO code</i>	<i>Description</i>	<i>SIC code</i>
1301	Guided missiles and space vehicles	3761
1302	Ammunition, except for small arms, n.e.c.	3483
1303	Sighting and fire control equip.	3795
1305	Small arms	3484
1306	Small arms ammunition	3482
1307	Ordnance and accessories, n.e.c.	3489
1401	Meat products	2011
1402	Creamery butter	2021
1403	Natural, processed, and imitation cheese	2022
1404	Dry, condensed, and evaporated dairy products	2023
1405	Ice cream and frozen desserts	2024
1406	Fluid milk	2026
1407	Canned and cured fish and seafoods	2091
1408	Canned specialties	2032
1409	Canned fruits, vegetables, preserves, jams, and jellies	2033
1410	Dehydrated fruits, vegetables, and soups	2034
1411	Pickles, sauces, and salad dressings	2035
1412	Prepared fresh or frozen fish and seafoods	2092
1413	Frozen fruits and vegetables	2037
1414	Flour and cereal preparations	2041
1415	Prepared feeds for animals and fowls	2047
1416	Rice milling	2044
1417	Wet corn milling	2046
1418	Bakery products	2051
1419	Sugar	2061
1420	Confectionery and related products	2064
1421	Alcoholic beverages	2082
1422	Bottled and canned soft drinks	2086
1423	Flavoring extracts and flavoring syrups, n.e.c.	2087
1424	Cottonseed oil mills	2074

<i>IO code</i>	<i>Description</i>	<i>SIC code</i>
1425	Soybean oil mills	2075
1426	Vegetable oil mills, n.e.c.	2076
1427	Animal and marine fats and oils	2077
1428	Roasted coffee	2095
1429	Edible fats and oils, n.e.c.	2079
1430	Manufactured ice	2097
1431	Macaroni, spaghetti, vermicelli, and noodles	2098
1432	Food preparations, n.e.c.	2096
1501	Cigarettes, cigars, etc.	2111
1502	Tobacco stemming and redrying	2141
1601	Broadwoven fabric mills and fabric finishing plants	2221
1602	Narrow fabric mills	2241
1603	Yarn mills and finishing of textiles, n.e.c.	2269
1604	Thread mills	2284
1701	Carpets and rugs	2273
1706	Coated fabrics, not rubberized	2295
1707	Tire cord and fabrics	2296
1709	Cordage and twine	2298
1710	Textile goods, n.e.c.	2299
1801	Hosiery	2251
1802	Knit apparel mills	2253
1803	Knit fabric mills	2257
1804	Apparel made from purchased materials	2311
1901	Curtains and draperies	2391
1902	Housefurnishings, n.e.c.	2392
1903	Fabricated textile products, n.e.c.	2393
2001	Logging	2411
2002	Sawmills and planing mills, general	2421
2003	Hardwood dimension and flooring mills	2426
2004	Special product sawmills, n.e.c.	2429
2005	Millwork	2431
2006	Veneer and plywood	2435
2007	Prefabricated wood structures	2439
2008	Wood preserving	2491
2009	Wood products, n.e.c.	2448
2100	Wood containers, n.e.c.	2441
2201	Wood household furniture	2511
2202	Upholstered household furniture	2512
2203	Metal household furniture	2514
2204	Mattresses and bedsprings	2515
2301	Wood office furniture	2521
2302	Office furniture, except wood	2522
2303	Public building and related furniture	2531

<i>IO code</i>	<i>Description</i>	<i>SIC code</i>
2304	Wood partitions and fixtures	2541
2305	Partitions and fixtures, except wood	2542
2306	Drapery hardware and window blinds and shades	2591
2307	Furniture and fixtures, n.e.c.	2599
2401	Pulp mills	2611
2404	Envelopes	2677
2405	Sanitary paper products	2676
2407	Converted paper products, n.e.c. except containers	2671
2408	Paper and paperboard mills	2621
2500	Paperboard containers and boxes	2652
2601	Newspapers	2711
2602	Periodicals	2721
2603	Book printing and publishing	2731
2604	Miscellaneous publishing	2741
2605	Commercial printing	2752
2606	Manifold business forms, blankbooks and binders	2761
2607	Greeting cards	2771
2608	Miscellaneous printing services	2789
2701	Industrial inorganic and organic chemicals	2812
2702	Fertilizers	2873
2703	Pesticides and agricultural chemicals, n.e.c.	2879
2704	Miscellaneous chemical products	2861
2801	Plastics materials and resins	2821
2802	Synthetic rubber	2822
2803	Cellulosic manmade fibers	2823
2804	Manmade organic fibers, except cellulosic	2824
2901	Drugs	2833
2902	Cleaning preparations	2841
2903	Toilet preparations	2844
3000	Paints and allied products	2851
3101	Petroleum refining and related products	2911
3102	Asphalt paving mixtures and blocks	2951
3103	Asphalt felts and coatings	2952
3201	Tires and inner tubes	3011
3202	Rubber and plastics footwear	3021
3203	Reclaimed rubber and miscellaneous rubber products	3061
3204	Miscellaneous plastics products, n.e.c.	3081
3205	Rubber and plastics hose and belting	3052
3206	Gaskets, packing, and sealing devices	3053
3300	Leather tanning and finishing	3111
3401	Boot and shoe cut stock and findings	3131
3402	Shoes, except rubber	3142
3403	Other leather products	3151

<i>IO code</i>	<i>Description</i>	<i>SIC code</i>
3501	Glass and glass products, except containers	3211
3502	Glass containers	3221
3601	Cement, hydraulic	3241
3602	Brick and structural clay tile	3251
3603	Ceramic wall and floor tile	3253
3604	Clay refractories	3255
3605	Structural clay products, n.e.c.	3259
3606	Vitreous china plumbing fixtures	3261
3607	Vitreous china food utensils	3262
3608	Porcelain electrical supplies	3264
3609	Pottery products, n.e.c.	3269
3610	Concrete block and brick	3271
3611	Concrete products, except block and brick	3272
3612	Ready-mixed concrete	3273
3613	Lime	3274
3614	Gypsum products	3275
3615	Cut stone and stone products	3281
3616	Abrasive products	3291
3617	Asbestos products	3292
3619	Minerals, ground or treated	3295
3620	Mineral wool	3296
3621	Nonclay refractories	3297
3622	Nonmetallic mineral products, n.e.c.	3299
3701	Blast furnace and basic steel products	3312
3702	Iron and steel foundries	3321
3703	Iron and steel forgings	3462
3704	Primary metal products	3398
3801	Primary smelting and refining of copper	3331
3804	Primary aluminum	2819
3805	Primary nonferrous metals, n.e.c.	3339
3806	Secondary nonferrous metals	3341
3807	Rolling, drawing, and extruding of copper	3351
3808	Aluminum rolling and drawing	3353
3809	Nonferrous rolling and drawing, n.e.c.	3356
3810	Nonferrous wiredrawing and insulating	3357
3811	Aluminum castings	3363
3812	Copper foundries	3366
3813	Nonferrous castings, n.e.c.	3364
3814	Nonferrous forgings	3463
3901	Metal cans	3411
3902	Metal shipping barrels, drums, kegs, and pails	3412
4001	Enameled iron and metal sanitary ware	3431
4002	Plumbing fixture fittings and trim	3432

<i>IO code</i>	<i>Description</i>	<i>SIC code</i>
4003	Heating equipment, except electric and warm air furnaces	3433
4004	Fabricated structural metal	3441
4005	Metal doors, sash, frames, molding, and trim	3442
4006	Fabricated plate work (boiler shops)	3443
4007	Sheet metal work	3444
4008	Architectural and ornamental metal work	3446
4009	Miscellaneous metal work	3448
4101	Screw machine products, bolts, etc.	3451
4102	Metal stampings	3465
4201	Cutlery	3421
4202	Hand and edge tools including saws	3423
4203	Hardware, n.e.c.	3429
4204	Coating, engraving and allied services	3471
4205	Miscellaneous fabricated wire products	3495
4207	Steel springs, except wire	3493
4208	Pipe, valves, and pipe fittings	3491
4210	Metal foil and leaf	3497
4211	Fabricated metal products, n.e.c.	3499
4301	Turbines and turbine generator sets	3511
4302	Internal combustion engines, n.e.c.	3519
4400	Farm machinery	3523
4501	Construction machinery and equipment	3531
4502	Mining machinery, except oil field	3532
4503	Oil and gas field machinery and equipment	3533
4601	Elevators and moving stairways	3534
4602	Conveyors and conveying equipment	3535
4603	Hoists, cranes, and monorails	3536
4604	Industrial trucks and tractors	3537
4701	Machine tools, metal cutting types	3541
4702	Machine tools, metal forming types	3542
4703	Special dies and tools and machine tool accessories	3544
4704	Metalworking machinery, n.e.c.	3546
4801	Food products machinery	3556
4802	Textile machinery	3552
4803	Woodworking machinery	3553
4804	Paper industries machinery	3554
4805	Printing trades machinery and equipment	3555
4806	Special industry machinery, n.e.c.	3559
4901	Pumps and compressors	3561
4902	Ball and roller bearings	3562
4903	Blowers and fans	3564
4904	Industrial patterns	3543
4905	Mechanical power transmission equipment	3566

<i>IO code</i>	<i>Description</i>	<i>SIC code</i>
4906	Industrial process furnaces and ovens	3567
4907	General industrial machinery and equipment, n.e.c.	3569
4908	Packaging machinery	3565
5000	Machine shop products	3592
5101	Computing and related machines	3571
5103	Scales and balances, except laboratory	3596
5104	Office machines, n.e.c.	3579
5201	Automatic vending machines	3581
5202	Commercial laundry equipment	3582
5203	Refrigeration and heating equipment	3585
5204	Measuring and dispensing pumps	3586
5205	Service industry machinery, n.e.c.	3589
5301	Instruments to measure electricity	3825
5302	Power, distribution, and specialty transformers	3612
5303	Switchgear and switchboard apparatus	3613
5304	Motors and generators	3621
5305	Relays and industrial controls	3625
5307	Carbon and graphite products	3624
5308	Electrical industrial apparatus, n.e.c.	3629
5401	Household cooking equipment	3631
5402	Household refrigerators and freezers	3632
5403	Household laundry equipment	3633
5404	Electric housewares and fans	3634
5405	Household vacuum cleaners	3635
5407	Household appliances, n.e.c.	3639
5501	Electric lamp bulbs and tubes	3641
5502	Lighting fixtures and equipment	3645
5503	Wiring devices	3643
5601	Household audio and video equipment	3651
5602	Prerecorded records and tapes	3652
5603	Telephone and telegraph apparatus	3661
5604	Communication equipment	3663
5701	Electron tubes	3671
5702	Semiconductors and related devices	3674
5703	Other electronic components	3672
5801	Storage batteries	3691
5802	Primary batteries, dry and wet	3692
5803	X-ray apparatus and tubes	3844
5804	Electrical equipment for internal combustion engines	3694
5805	Electrical equipment, n.e.c.	3695
5901	Truck and bus bodies	3713
5902	Truck trailers	3715
5903	Motor vehicle parts and accessories	3711

<i>IO code</i>	<i>Description</i>	<i>SIC code</i>
6001	Aircraft	3721
6002	Aircraft and missile engines and engine parts	3724
6004	Aircraft and missile equipment, n.e.c.	3728
6101	Ship building and repairing	3731
6102	Boat building and repairing	3732
6103	Railroad equipment	3743
6105	Motorcycles, bicycles, and parts	3751
6106	Trailer coaches	3716
6107	Transportation equipment, n.e.c.	3799
6201	Engineering and scientific instruments	3812
6202	Mechanical measuring devices	3823
6203	Environmental controls	3822
6204	Surgical and medical instruments and apparatus	3841
6205	Surgical appliances and supplies	3842
6206	Dental equipment and supplies	3843
6207	Watches, clocks, and parts	3873
6209	Electromedical and electrotherapeutic apparatus	3845
6210	Laboratory apparatus and furniture	3821
6302	Ophthalmic goods	3851
6303	Photographic equipment and supplies	3861
6401	Jewelry, including costume and silverware	3911
6402	Musical instruments	3931
6403	Games, toys, etc.	3942
6404	Sporting and athletic goods, n.e.c.	3949
6405	Pens, pencils, etc.	3951
6408	Brooms and brushes	3991
6409	Hard surface floor coverings, n.e.c.	3996
6410	Burial caskets	3995
6411	Signs and advertising specialties	3993
6412	Manufacturing industries, n.e.c.	3999