

**APPENDIX TABLES\***

FOR

**PRICE-FIXING OVERCHARGES:  
LEGAL AND ECONOMIC EVIDENCE**

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Working Paper

\* Professor Robert H. Lande was responsible for preparing the material on overcharges from antitrust verdicts in U.S. courts. Jeff Zimmerman, David Ubilava, and Yuliya Bolotova were of great assistance in doing data cross-checks and in rechecking the tables summarizing the social-science overcharges.

**Appendix Table 1. Alphabetic List of Cartelized Markets**

Cartel Market Name	Code No.	Characteristics				Number of	
		Interna- tional	Loca- tion	Bid Rig- ging	Found Guilty, Liable for Civil Penalties, or Extralegal <sup>c</sup>	Epi- sodes	Obs., aver- age
Acrylic Glass/MMA and PMMA	343	X	GLOBAL		EU fines, US civil suit	3	3
Air cargo US-Korea	345	X	GLOBAL		US fines	1	1
Air cargo US-UK	346	X	GLOBAL		US, UK fines	1	1
Air passengers, US-UK	347	X	GLOBAL		US fines	1	0
Air passengers, US-Korea	348	X	GLOBAL		US fines	1	1
Air Routes, Brazil	325		BR		Fined by CADE	1	1
Air Routes, Danish	235	X	EUR		EC fines	2	2
Air Routes, Hawaii	294		US			1	4
Airline ticket commissions, US	354		US		US civil suit settlement	1	1
Airlines, US passenger	172		US			1+	1
Almonds, US and export	205		US		Legal cartel	2	2
Aluminum, metal (interwar & earlier)	18	X	EUR		U.S. consent decree	6	28
Aluminum, metal (1990s)	199	X	GLOBAL			1	1
Aluminum foil, JP	276	X	JP		JFTC probe	1	1
Aluminum phosphide, US	82		US		U.S. guilty pleas	1	2
Anti-anxiety drugs, US	370		US		US FTC fines	1	1
Asphalt, Seine-Maritime, FR	305		FR	X	FR fines	1	1
Asphalt, Alabama, US	204		US	X	US settlement	1	2
Asphalt, Oklahoma, US	7		US	X	Jury trial decision	1	1
Asphalt, Suffolk County, New York	328		US	X	Guilty pleas	1	1
Asphalt, Sweden	331	X	SW	X	SW fines	1	1
Auction houses, fine art	42	X	US+UK		U.S. pleas, EU fines	1	7
Auctions, houses in DC, US	53		US	X	U.S. trial	1	1
Auctions, used police cars, NY City	52		US	X	Civil settlement	1	2
Automobile manufacture, US	25		US			1	2
Automobile testing equipment, JP	308	X	JP	X	JFTC sanctions	1	1
Ball & roller bearings, France	115	X	FR		France, fines	1	1
Banks, Euro Zone fees, DE & NL	216	X	DE		EU fines	2	9
Bank loans, Hong Kong	357		HK			1	1
Basmati rice auctions, Panipat, India	340		IN	X		1	2
Bath tubs, iron, UK	63		UK		Legal cartel	1	1
Bath tubs, enameled, US	239		US		US trial	1	1
Battery recycling, Italy	374	X	IT		IT fines	1	1
Batteries, auto, Korea	251		KR		KFTC fines	2	2
Bedsteads, metal, UK	167		UK		Legal cartel	1	1
Beef purchases in California, US	45		US		US trial	1	1
Beer brewing, Korea	252		KR		KFTC fines	1	1
Bitumen, NL	386	X	NL		UC fines	1	2
Bleaching powder, UK	383		UK			3	4
Bleaching powder, US	384	X	US			1	1
Blueberries, wild, purchases, ME	264		US		US trial	1	1
Boats, Phnom Penh, Cambodia	369		CB			1	2
Bond underwriting, US	153		US	X		1	1

Bookstores, college, IUPUI, US	326		US		US criminal conviction	1	1
Borax Trust	3XX		GLOBAL		Congressional Investigation	1	1
Bread, white pan, US	37		US		U.S. Appeals Court	1	1
Bricks, China	244		China		China AMB fines	1	1
Broadband internet service, Korea	281	X	KO		KFTC fines	1	1
Bromine, US	6	X	US		U.S. guilty pleas	3	4
Bromine	246	X	GLOBAL		US guilty pleas	1	1
Buspirone drug, US	317	X	US		US civil suit	1	1
Cable, rubber & plastic, UK	59		UK		Legal cartel	1	1
Cable TV operators, Taiwan	243		Taiwan		TWFTC fines	6	7
Cables, electric power, Germany	124		DE	X	Germany, fines	1	1
Calcium carbide	388	X	FR		Legal, acquitted at trial	1	1
Carbon, arc lighting, US	188		US		Legal cartel	2	2
Carbon black, US exports	152		US		Legal export cartel	1	1
Carbon dioxide, US	202		US		US civil settlement	1	2
Carbon fiber, US	198		US		US investigation	1	1
Cardizem CD hypertension medicine, US	203	X	US		US FTC and civil trial	1	3
Carpets, polypropylene US	319		US		US fine	1	1
Carton board, EU	39	X	EUR		EU fines	1	1
Cartons, corrugated, US	142		US		US trials	1	8
Carpets, polypropylene, US	224		US		US trial	1	1
Carpets, woven, UK	62		UK		Legal cartel	1	1
Cathode ray tubes (see electronic radio & TV tubes)							
Cattle procurement, fed, US	271		US	X	Jury trial	1	1
Cell phones (see telephone)							
Cement, Aegean region, Turkey	314		TU		Turkey fines	1	2
Cement, Brazil	353	X	BR			1	1
Cement, Corsica, France	339		FR		France fines	1	1
Cement, Egypt	327		EG			1	1
Cement, Germany	106	X	DE	X	Germany, fines	1	1
Cement, Jalalpur, India	363	X	IN	X	India, consent decree	1	1
Cement, Norway	212		NO		Legal cartel	1	3
Cement, Pakistan	358		PK		Restitution requested by Govt	1	1
Cement, Romania	277	X	ROM	X	Romania fines	1	2
Cement, Turkey	329		TU		Turkey fines	1	2
Cement, South Africa	70		ZA	X		1	2
Chicken, US	144		US		US trial & decree	1	1
Cigarettes, U.S.	26		US			1	1
Citric acid	76	X	GLOBAL		U.S. pleas, EU fines	1	7
Chocolate candy	372	X	GLOBAL		U.S. damages suit	1	1
Choline chloride	81	X	GLOBAL		US jury trial	2	6
Coal, anthracite, eastern US	160		US		US trial	11	16
Coal, black, Australia	179		AU			6	9
Coal, Newcastle, England	166		UK		Parliamentary inquiries	23	29
Coal, Nord-Pas-de-Calais, FR	323		FR		Legal cartel	3	3
Coal, Ruhr, Germany	155		DE		Legal cartel	3	8
Coal, interwar, UK	324		UK		Legal cartel	2	2
Coconut oil, Philippines	206		PL		Legal cartel	1	1

Coffee, Hungary	248	X	HU		Hungary, fines	1	1
Coke	147	X	EUR		Legal export cartel	2	2
Concrete, Denmark	51		DK	X		1	1
Concrete, ready mix, Germany	114	X	DE	X	Germany, fines	1	1
Construction: see also asphalt							
Construction, agric. engineering projects, JP	305	X	JP		JFTC sanctions	1	1
Construction & other industries, US	196		US	X	US convictions	1	1
Construction & procurement, JP	213		JP	X	JFTC actions	21 <sup>b</sup>	5
Construction, buildings, Germany	174		DE	X	Germany fines	1	1
Construction, concrete, NY, US	261		US	X	US trial	1	1
Construction, electric wiring contractors, Denmark	122		DK	X	Denmark, fines	1	3
Construction, electrical, France	175		FR	X	France consent decree	1	1
Construction, kitchen, Japan	163		JP	X	Japan trial	1	1
Construction machinery mfg., Korea	278	X	KO		Korea FTC fines	1	1
Construction, Natl. Library façade, CH	312		CH	X	Swiss fines	1	2
Construction, Netherlands	108	X	NL	X	Netherlands, fines	1+	3
Construction, Normandy Bridge, FR	247		FR	X	French fines	1	1
Construction, Norway	107	X	NO	X	Norway, probe	1+	2
Construction, public, Japan	161		JP	X	A few civil actions	1+	2
Construction, public bridges, JP	322		JP	X	JFTC and High Court fines	1	2
Construction projects, Korea	32		KO	X	Korea, fines	1+	1
Construction, roads, Colorado, US	222		US	X	US trial	1	3
Construction, roads, Korea	193		KO	X	Korea FTC fines	1	1
Construction, roads, Florida, US	1		US	X	Trials, settlements	1+	1
Construction, roads, France	177		FR	X	France consent decree	1	1
Construction, roads, Germany	123		DE	X	Germany, fines	1+	1
Construction, roads, NY, US	260		US	X	US trial	3	3
Construction, roads, SD & NC, US	34		US	X	Trials, settlements	1+	2
Construction, roads, seal coating, US	211		US	X		1 <sup>b</sup>	2
Construction, roads, US	195		US	X	Trials, settlements	1+	2
Construction, schools, 4 towns, France	342		FR	X	Fines, France	88 <sup>b</sup>	4
Construction, school bldg., China	245		China	X	China AMB fine	1	1
Construction, sewers, Lithuania	368		LT	X	Commission decision	1	1
Construction, sewers, US	33		US	X	Trial	1+	3
Construction, tendered, SRO, NL	290		NL	X	EC fines	1+ <sup>b</sup>	1
Construction, university, France	176		FR	X	France consent decree	1	1
Construction, US Navy shipyard, Japan	162		JP	X	JFTC fines	1	1
Construction, wastewater, USAID in Egypt	101	X	EGY	X	U.S. trial, conviction	1	2
Copper metal	22	X	US/GLOBAL			8	37
Copper concentrate	88	X	GLOBAL		US, EU Probes	1	1
Copper smelters, UK	225		UK	X		4	4
Dairy processing, US	54		US		US consent decree	1	1
Defense Department procurement, US	367		US	X		1	1
Diamonds, gem, So. Africa	71	X	ZA		Legal cartel	1	1
Diabetes testing strips, PT	330	X	PT	X	PT fines	2	2
Distribution, drugs, ZA	364	X	ZA	X	ZA authority report	1	1
Distribution, food, New York City	366		US	X	US convictions	1	1

Distributors, natural gas, TW	229		TW		TFTC fines	2	2
Dredging, river, Japan	164		JP	X	Japan trial	1	1
DRAMs (memory chips)	292	X	GLOBAL		US guilty pleas	1	1
Drugs (also see pharmaceuticals)							
Drug-gang cartel, local US	373		US		Never penalized	4	7
Dyestuffs, synthetic	159	X	EUR		Legal cartel	2	3
Education, bar review prep., GA	263		US		US trial	1	1
Electric light bulbs	21	X	EUR			1	12
Electric light bulbs, US	189		US			2	3
Electric light bulbs, UK	184		UK		UK Commission	1	5
Electric meters, UK	61		UK	X	Legal cartel	1	1
Electric motors, UK	60		UK		Legal cartel	1	1
Electric pipes, Israel	249		IL		Israel court fines, prison	1	1
Electric power equipment, U.S.	48		US	X	US pleas, settlements	1	19
Electric hydro-power equipment, NO	116	X	NO	X	Norway, fines	1+	1
Electric power equipment, global	129	X	EUR	X	US conviction	1	3
Electric power equipment, Japan	273		JP	X		1	1
Electric power equipment, UK	183		UK	X	UK Commission	1	4
Electrical subcontracting, GA, US	267		US	X	US trial	1	1
Electronic radio & TV tubes, UK	192	X	UK		UK Commission	1	6
Explosives, US	98	X	US	X	U.S. guilty pleas	1	1
Eurocheque commissions, EU	289	X	EU		EC fines	1	1
Fertilizer (see nitrogen, phosphate, potash)	--						
Fire protection installation, AU	121		AU		Australia, fines	1	1
Ferrosilicon, US	100	X	US		U.S. pleas	1	1
Flour milling, KO	332		KO		KFTC fines	1	1
Flour imports, Taiwan	220		TW		TW FTC fines	1	2
Ferry services, English Channel	41	X	EUR		EU, fines	1	1
Football replica kits, UK	311		UK		UK OFT fines	1	3
Forklift trucks mfg., Korea	279	X	KO		Korea FTC fines	1	1
Frozen foods, Australia	120		AU		Australia, fines	1	1
Frozen fish procurement, US	36		US	X	US guilty pleas	1	3
Fuels, military, Korea	112	X	KO	X	Korea, fines	1	2
Futures contract, ME potatoes, US	266		US		US trial	1	1
Garbage collection, NY & NJ	233		US	X	NYC convictions	2	2
Gas, liquid propane, Israel	349		IL		Israel guilty pleas	1	1
Gas, liquid propane, Mexico	253		MEX		Mexican FCC fine	1	1
Gas, liquid propane, Taiwan	242		Taiwan		TWFTC fines	1	1
Gas, natural, distribution, Taiwan	221		Taiwan		Taiwan FTC fines	1	1
Gasoline, retail, Florianopolis, Brazil	360		BR		Fined, Brazil	1	1
Gasoline, retail, Italy	109	X	IT		Italy, fines	1	1
Gasoline, retail, France	110	X	FR		France, fines	1	1
Gasoline, diesel, & kerosene, Korea	337	X	GLOBAL		Korea, fines	1	1
Gasoline, retail, Sweden	111	X	SE		Swedish court, fines	1	1
Gasses, compressed, Canada	102	X	CA	X	Canada, fines	1	2
Gasses, compressed, NL	274	X	NL		EU fines	4	5

Glass, flat, Benelux	237	X	EUR		EU fines	1	1
Glass, flat, Korea	381		KR		KFTC fines	1	1
Glass, flat, US	113	X	US		US settlement	1	1
Glass, window, US	380		US		Legal	1	1
Graphite electrodes	84	X	GLOBAL		US, CA, EU, KR fines	1	16
Graphite, isostatic	351	X	GLOBAL		EU fines	1	1
Gunpowder, US	158		US		First episode legal	2	2
Gymnasium seats, folding, US	2		US	X	US settlements	1	2
Gypsum wallboard, US	269		US		US trial	1	1
Harbor loading services, Taiwan	240		TW		TWFTC fines	1	1
Hardwood, US	284		US		US trial	1	1
High fructose corn syrup, US	197		US		US settlements	1	1
Hotel association, Spain	125		ES		Spain, fines	1	2
Hotels, luxury, Paris, FR	305		FR		France fines	1	1
Ice cream manufacture, Korea	338		KO		KFTC fines	1	1
Infant & baby formulas, Italy	286	X	IT		IT fines (twice)	2	9
Insecticide, forest, Canada	83	X	CA	X	Canada pleas	1	1
Insurance brokers' fees, US & UK	336	X	GLOBAL	X	US settlements	1	2
Insurance, auto, Korea	250		KO		KFTC fine	1	1
Iron & steel rolls, cast, EU	227	X	EUR	X	EU fines	1	1
Iodine	40	X	EUR		Legal export cartel	1	1
Jute textile, U.S.	344		US		Legal	1	2
Jute yarn and bags, India	359		IN		Legal	2	2
Lamp oil (Kerosene), U.S.	375		US		Legal	2	2
Lead	69	X	GLOBAL		Legal export cartel	4	7
Lease oil fees for landowners, US	355		US		US civil settlement	1	1
Legal aid fees, DC, US	256		US		US trial	1	1
Lemons, California	210		US		Legal cartel	1	2
Linerboard, US	201		US		US civil settlement	1	1
Linoleum exports	137	X	EUR		Legal export cartel	1	1
Linoleum, UK	180		UK		UK Commission	1	3
Liquor, retail, TX, US	258		US		US trial	1	1
Lysine	75	X	GLOBAL		US pleas, EU fines	2	29
Manufacturing, W. Germany	304		DE		Legal "rationalization" cartels	3	3
Manufacturing basic materials, JP	214		JP		JFTC actions	14 <sup>b</sup>	1
Manufacturing, Sweden	303		SW		Legal cartels	1	1
Manufacturing, UK	55		UK		Legal cartels	40 <sup>b</sup>	1
Manufacturing, U.S.	38		US		US pleas, fines	57 <sup>b</sup>	1
Magnesium metal	28	X	US		US pleas, fines	2	6
Magnesite	94	X	EUR		US prosecution	1	1
Market makers, NASDAQ, US	31		US		U.S. settlements	1	1
MCAA	385		GLOBAL		US, EU fines	2	2
Mercury	72	X	EUR		Legal cartel	4	13
Methionine	78	X	GLOBAL		EU fines, US settlements	3	7

Methyl glucamine	85	X	GLOBAL		EC, Canada fines	1	1
Methyl methacrylate (see Acrylic)							
Microcrystalline cellulose (MCC)	356	X	GLOBAL		US FTC consent decree	2	2
Milk, mfg., 3 counties, Kentucky	9		US	X	U.S. state convictions	1	1
Milk, mfg., 2 counties, Florida	10		US	X	U.S. state convictions	1	1
Milk, mfg., 3 counties, Florida	11		US	X	U.S. state convictions	1	1
Milk, mfg., Danville, Kentucky	12		US	X	U.S. state convictions	1	1
Milk, mfg., Owensboro, KY	13		US	X	U.S. state convictions	1	1
Milk, mfg., core area, Kentucky	14		US	X	U.S. state convictions	1+	1
Milk, mfg., Southeastern U.S.	15		US	X	U.S. state convictions	109 <sup>b</sup>	1
Milk, mfg., Dallas, Texas	19		US	X	U.S. settlement	1	1
Milk, mfg., North Texas	262		US		US trial	1	1
Milk, mfg., Cincinnati, Ohio	30		US	X	U.S. trial	1	1
Milk, mfg., AMPI cooperative	226		US		U.S. trial	1	1
Milk, U.S. marketing orders	207		US		Legal cartel	1	3
Mobile/cell phones (see telephone)							
Movie rentals, first run, MN, US	259		US		US trial	1	1
Mushrooms, canned, Germany	230	X	GLOBAL		EC fines	1	1
Nails, Germany	186		DE		Legal cartel	1	1
Natural gas pipeline bid to Calif.	316		US	X	Civil US settlement	1	1
Nitrogen (sodium nitrate) fertilizer	16	X	GLOBAL		Legal cartel	2	7
Nitrogen, nitrate, ammonium sulfate for fertilizer, Chile	217		Chile		Legal cartel	6	9
Nonferrous metals, UK	181		UK		UK Commission	1	2
Oil (see petroleum)							
Oranges, California navel	209		US		Legal cartel	1	2
Paper, carbonless, EEC/EU	89	X	EUR		EC fines	1	4
Paper, newsprint, CA	302		CA		Legal cartel	1	1
Paper pulp, bleached sulphate	228	X	GLOBAL		EC fines	2	4
Paper pulp, mechanical sulfite	138	X	EUR			1	1
Paper, thermal fax, US	99	X	US		U.S. pleas & trial	1	1
Paper, toilet, KO	315		KO		KFTC fines	1	1
Paints, export, Japan	157		JP		Legal cartel	1	1
Petroleum distribution, Iceland	285	X	IS		Convicted	1	2
Petroleum, US	24	X	US			1	1
Petroleum, TX & Okla.	190		US		Legal cartel	1	1
Petroleum, offshore leases, US	154		US	X		1	1
Petroleum refining, Midwest	35		US		U.S. trial	1	1
Petroleum, lamp oil, Ontario	134		CA		Legal cartel	3	3
Pharmaceuticals, UK	105	X	UK	X	UK probe	1	1
Pharmaceuticals, US	141		US		US trial	1	1
Pharmaceuticals, respiratory, Italy	118	X	IT	X	Italy, fines	1	1
Pharmaceuticals, cholesterol, Italy	119	X	IT	X	Italy, fines	1	1
Phosphate rock exports, US	135	X	US		U.S. indictment	2	3
Phosphorus, red	132	X	EUR			1	1
Pipes, cast iron, SE US	23		US		U.S. trial	1	10
Pipes, concrete, US	143		US	X	US trials	1	2

Platinum	47	X	EUR			3	11
Plumbing fixtures, US	156		US		US trial	1	1
Plywood, US	145		US		US trial	1	2
Plywood, Japan	178		JP	X	JFTC fines	1	1
Polyvinyl chloride plastic	232	X	EUR		EC fines	1	1
Potassium chloride, slow release US	301		US		FTC sanctions	1	1
Polypropylene, EU	272	X	EUR		EC fines	1	1
Porcelain, sanitary, UK	57		UK		Legal cartel	1	1
Potash, International	73	X	EUR		Last episode 1935-39 US conviction	4	28
Potash, Canada exports	352	X	CA		U.S. class action voided	1	1
Professional associations fees, KO	310		KO		KO govt. made cartels illegal	1	3
Quebracho tanning agent	50	X	ARG		U.S. conviction	4	15
Quinine	131	X	EUR		U.S. pleas, fines	1	2
Radium	300	X	GLOBAL		Legal cartel	3	3
Railroad, Chicago to East, US	49		US		Legal U.S. cartel	1+	7
Railroad, U.S. South	133		US		Legal U.S. cartel	1	1
Raisins, US	208		US		Legal US cartel	1	1
Rare books auction, bidding ring, UK	291		UK	X		1	1
Rayon (Artificial Silk)	136	X	EUR			2	2
Raw materials, Germany	350		DE		Legal	1 <sup>b</sup>	1
Real estate auction, Wash. DC, US	334		US	X	Guilty at trial	1	1
Realtors' listing service, CA, US	257		US		US trial	1	1
Realtors' sales commissions, MD	268		US		US trial	1	1
Roofing felt, Belgium	219		BL		EU fines	1	1
Roundwood (logs) buying, Sweden	236		SW	X		2	2
Rubber, crude	20	X	EUR		Legal export cartel	2	5
Rubber, polychloroprene synthetic	293	X	GLOBAL		U.S. guilty pleas	1	1
Salt, Michigan	194		US			2	4
Salt, rock, US	3		US	X	U.S. convictions	1	1
Salt, white, Salt Union, UK	168		UK		Legal cartel	3	11
Salt, white, duopoly, UK	215		UK		Commission decision	1	1
School uniforms, KO	309		KO		KFTC fines	1	4
Scholarships, graduate, US	173		US		DOJ consent decree	1	1
Securities, Nasdaq exchange, US	318	X	US		US civil suit	1	1
Shipping-agent services, PT	333		PT		PCA fine	1	1
Shipping, EATA	287	X	GLOBAL		EC consent decree	1	1
Shipping, France-Africa	43	X	EUR		EU fines	1	1
Shipping, 3 UK conferences	171	X	EUR		Legal cartels	15 <sup>b</sup>	2
Shipping, chemical parcel tankers	86	X	GLOBAL	X	U.S. convictions	1	1
Shipping, express packages, US	127		US		Legal U.S. cartel	1	2
Soil & gravel, Japan	165		JP	X	JFTC warning?	1	1
Soft drinks, US	27		US			1	1
Sodium chlorate	79	X	EUR			1	1
Sorbates	77	X	GLOBAL		US and EU fines	1	5
Stamp auctions, bidding ring	371	X	GLOBAL	X	US fines1	1	1
Steel and iron, Germany	238		DE		Legal cartel	4	5

Steel, bulk metal, European	74	X	EUR		Legal cartel	2	6
Steel, road culverts, US	254		US	X	US trial	2	2
Steel drums, UK	64		UK		Legal UK cartel	1	1
Steel girders, Germany	187		DE		Legal cartel	1	1
Steel, integrated, Japan	270		JP		Government-tolerated	1	2
Steel pipes, sewage, UK	58		UK		Legal UK cartel	1	1
Steel pipes, insulated, EU	93	X	EUR		EU fines	1	4
Steel, pipes, specialty, US	320	X	US	X	US fines	1	1
Steel rails, US	150		US		First episode legal	1	1
Steel rails, Europe	169	X	EUR		Legal cartel	2	3
Steel, seamless tubes, EU	91	X	EUR		EU fines	1	4
Steel tubes, US	151		US		Legal cartel	1	1
Steel, flat rolled	218	X	GLOBAL			1	1
Steel, flat rolled, Brazil	361		BR		Brazil (CADE) fines	2	2
Steel, flat stainless, EU	92	X	EUR		EU fines	1	3
Steel, structural, buildings, US	4		US	X	U.S. convictions	1	2
Steel, semi-finished, France	295		FR		Legal cartel	1	1
Steel, structural, France	296		FR		Legal cartel	1	1
Steel, merchant bars, France	297		FR		Legal cartel	1	1
Steel, thick plates, France	298		FR		Legal cartel	1	1
Steel, thin sheets, France	299		FR		Legal cartel	1	1
Steel, structural, bridges, US	5		US	X	U.S. convictions	2	5
Steel, structural, EU	95	X	EUR		EU fines	1	1
Sulfur	87	X	GLOBAL			4	12
Sulfur, crude, US exports	191		US		Legal export cartel	2	2
Sulfuric acid, US & Canada	103	X	US+CA		DOJ probe	1	1
Sugar beets procurement, US	44		US		U.S. trial	1	1
Sugar, cane	17	X	GLOBAL		Legal export cartel	2	5
Sugar refining, US	67		US		U.S. trial	3	8
Sugar refining, Korea	365		KR		KFTC fines	1	1
Sugar, Spain	126		ES		Spain, fines	1	1
Sugar refining, UK	96		UK		EU, fines	1	1
Taxi service, Lithuania	313		LI		Lithuania fines	1	1
Tea	128	X	EUR		Legal cartel	1	1
Tetracycline, US	223		US		Civil settlement	1	1
Thorium nitrate, Germany	170		DE		Legal cartel	1	1
Timber, buyers at US auctions	29		US	X		1	1
Tin	146	X	GLOBAL		Legal export cartel	3	8
Tin plated steel	376		US		Legal	1	1
Titanium metal, US	139		US	X	US trial	1	1
Telephone fees, UK & Germany	97	X	IT		EC probe	1	1
Telephone fees, Indonesia	382	X	ID		KPPU fines	1	1
Telephone fees, Italy	117	X	IT		Italy, fines	1	1
Telephone fees, local service, Korea	280	X	KO		KFTC fines	1	1
Telephone fees, long distance, Korea	282	X	KO		KFTC fines	1	1
Telephone fees, international, Korea	283	X	KO		KFTC fines	1	1
Terazosin hydrochloride drug, US	322	X	US		US civil suit	1	1
Thread, surgical, Taiwan	241	X	Taiwan	X	TWFTC fines	1	1
Tobacco leaf, US	200		US	X	US settlement	1	1

Tobacco leaf, Spain	288	X	ES		EU fines	2	9
Toiletries manufacturing, DE	362	X	DE		DE fines	1	1
Toys and games, UK	104	X	UK		UK OFT decision	1	3
Transformers, large, UK	65		UK	X	Legal UK cartel	1	1
Transformers, system, UK	66		UK	X	Legal UK cartel	1	1
Travel brokers' fees, UT, US	234		US		US trial	1	1
Tungsten carbide	8	X	GLOBAL		U.S. trial	2	12
Uranium metal	130	X	GLOBAL		U.S. pleas, settlements	1	7
Vanadium ore, US	46		US		U.S. jury trial	1	2
Vegetable parchment mfg., US	265		US		US trial	1	1
Visa & Mastercard fees, US	387	X	GLOBAL		Private settlement in US	1	1
Vitamins and Carotenoids, bulk <sup>a</sup>	80	X	GLOBAL		U.S. & EU fines	15 <sup>a</sup>	87
Vitamin C, China exports to US	275	X	China		US civil case	2	3
Vitamin D, US	140		US		Patent abuse trial	1	1
Vitamin B4 (see choline)							
Wallpaper manufacturing, BL	231		BL		EC fines	1	1
Wheat auctions, Nerala, India	341		IN	X		1	1
Wire, Germany	185		DE		Legal cartel	1	1
Wire, barbed , US	377	X	US		Legal cartel	1	1
Wire nails, US	149	X	US		Legal cartel	1	6
Wire, smooth steel, US	378	X	US		Legal cartel	1	1
Wire rope, non-marine, UK	56		UK		Legal UK cartel	1	1
Whiskey alcohol, US	148		US		First episode legal	5	6
Wire and cable, UK	182		UK		UK Commission	3	3
Zinc metal <sup>f</sup>	68	X	GLOBAL		Legal export cartel	5+	8
Zinc phosphate	90	X	EUR		Fined by EC	1	2
Total <b>388</b> markets	--		<b>137</b> intl.	<b>110</b>	about 263 guilty/liable <sup>d, e</sup>	1681 <sup>b</sup>	<b>1122</b> avg., <b>455</b> pe ak, <b>1579</b> total
Total <b>1176</b> net episodes <sup>g</sup>	--		<b>629</b> Intl.	<b>225</b>	<b>767</b> guilty/liable		

Source: Appendix Table 2 and References.

<sup>a</sup> One for all vitamins, one for the three Carotenoids, and twelve individual vitamins.

<sup>b</sup> These entries count multiple-market cartel summaries. For example, cartel #15 is the average of 109 separate geographic bid-rigging cases. (However, some other studies that have no superscript have multiple observations yet count only as one: examples are *Construction, tendered, SRO, NL* (cartel #290) over an 11-year period about 319,000 bids were rigged; in *Construction, roads, seal coating, US* (cartel #211) more than 3500 contracts were overtly collusive bids. Moreover, most bid-rigging cartels could in principle count each contract as an episode, but are treated here as one.) The total number of episodes is 541 higher than net episodes.

<sup>c</sup> Fines, trials, consent decrees, settlements, commission decisions, parliamentary inquiries, and *known* official investigations are all considered adverse sanctions for cartels. Adverse parliamentary and commission decisions resulted in changes in conduct similar to consent decrees. Blank cells signal a presumptively legal cartel.

<sup>d</sup> Includes a small number of markets that were being formally investigated by antitrust authorities; 90%+ will be officially sanctioned.

<sup>e</sup> Counts blank entries in column above. Blank entries are cases without information about any criminal sanctions or adverse civil proceedings and are presumptively legal or extralegal.

<sup>f</sup> This cartel was fined at the end of its life by the EC (8/6/1984) but operated openly in the belief that it was legal for most of its

existence.  
g) Episodes net of summary estimates (see note b above).

**Appendix Table 2. Summary of Price-Fixing Damages**

Cartel Type, Location, and Dates <sup>a</sup>	Method of Analysis	Overcharge or Undercharge		Source <sup>c</sup>
		Episodic <sup>b</sup>	Peak	
		<i>Percent</i>		
1. <b>Florida</b> state <b>road-building construction</b> contract auctions, 1738 projects, 1981-1986; no mention of convictions by Gupta, but by June 1983 the Florida Attorney General had collected \$15 million in fines and settlements from road construction companies the state.	Econometric model explains variation in price-cost margins; compares the minimum of 2 bidders with average number (5) of bidders. Maximum observed number of bidders in the sample (19) is the competitive benchmark.	28-37	34-45	Gupta (2001b: 464), <i>Christian Science Monitor</i> (6/15/1983:4)
2A. Bid rigging against schools by the <b>Folding Gymnasium Seating Council</b> , U.S., April 1954-early 1960; DOJ consent decree in early 1960; study controls for changes in costs	Benchmark pre-cartel price is for Jan.-Mar. 1954 (\$6.43) vs. avg. 1955-58 price of \$9.06 per foot	40.9	--	Erickson (1976: 192-193)
2B. Same as 2A above	Benchmark price is for brief breakdown period April-June 1959 (\$6.68)	35.6	--	Erickson (1976: 192-193)
2C. Same as 2A above	Benchmark price is post-cartel: Sept. 1960- March 1961 (\$6.95)	30.4	--	Erickson (1976: 192-193)
3. Bid rigging, <b>rock salt</b> sold to state and local governments, northern U.S.; began in early 1930s and renewed in 1948-49, but court testimony covers only 1954-1960; umbrella pricing by two largest U.S. companies; guilty at trial	But-for price is average of 1961-63 prices; study controls for changes in costs	60	66	Erickson (1976: 197)
4A. Bid rigging and market divisions, <b>structural steel</b> sold to construction contractors <b>for public buildings</b> , upper Midwest of U.S., March 1950–August 1962; probably convicted	Pre-conspiracy prices (1948-March 1950) compared to conspiracy period except for one brief breakdown in collusion; peak is 1961-62	9.0	27.9	Erickson (1976: 199)
4B. Same as 4A above	Conspiracy prices compared to post-conspiracy prices (Sept. 1962-Dec. 1963); peak prices from 1961-62	0	17.3	Erickson (1976: 199)
5. Bid rigging and market divisions, <b>structural steel</b> sold to construction contractors <b>for bridges</b> , upper Midwest of U.S., March 1950-Aug. 1962; meetings were “interrupted” from July 1960 to March 1961				
5A. Conspiracy period March 1950 – August 1962, excluding “interruption”	Benchmark price is for 1948-March 1950	9.0	--	Erickson (1976:199)
5B. Same as 5A.	Benchmark price is for 1948-March 1950	27.9	--	Erickson (1976:199)
5C. Late phase of conspiracy, April 1961 – August 1962	Benchmark price is for Sept. 1962 – Dec. 1963	0.0	--	Erickson (1976:199)
5D. Same as 5C.	Benchmark price is for Sept. 1962 – Dec. 1963	17.3	--	Erickson (1976:199)
5E. Same as 5A	Compares profit on equity 1950-1961 of a typical conspirator with the U.S. national industry average	50	--	Erickson (1976:199)

6. Price fixing of <b>bromine</b> sold to pharmaceutical manufacturers to make potassium bromide, U.S., three episodes:				
6A. National Bromine Co., pool 1885-1891	Base is 1880-1884 prices	9.7	19	Levenstein (1997)
6B. Shields pool, 1892-1902	Base is March 1891-October 1892 prices	65.2	126	Levenstein (1997)
6C. Shields pool, 1892-1902	Base is 1880-1884 prices	31.6	81	Levenstein (1997)
6D. Dow Chemical pool, 1902-1914	Base is several non-cooperative periods during 1905-1908	74.4	257	Levenstein (1997)
7. Bid rigging by 8 members of the Asphalt refiners Assn. of liquid <b>asphalt</b> contracts for the Oklahoma Highway Dept., 1954-1968, found guilty by jury trial	Comparison of constant OK winning bid price with yardstick: average delivered prices in 6 surrounding states supplied from OK	71	71	Funderburk (1974:69-70)
8A. Cemented <b>tungsten carbide</b> , invented by Krupp Steel and General Electric in early 1920s; two firms formed a cartel in 1928, protected by patents later invalidated; GE had a U.S. production monopoly, but Krupp sold to two US importers, which colluded with GE and were monopolistically bought by GE in 1936 and 1937; GE indicted for price fixing by DOJ in 1941, found guilty at trial in 1947	U.S. price in 1927 when Krupp still exported to U.S. compared to GE's U.S. 1928-Oct. 1936 price	800+	800+	Stocking and Watkins (1948:132-134), Berge (1944:43)
8B. Same as 8A	U.S. price 1928-36 compared to yardstick of (Krupp's) monopoly European price	787-886	--	Stocking and Watkins (1948:132-134), Berge (1944:43)
8C. Same as 8A above, except in second episode price lowered during Oct. 1936-1941	U.S. price October 1936 to 1941 compared to yardstick of (Krupp's) monopoly European price	99-302	--	Stocking and Watkins (1948:132-134)
8D. Same as 8C	U.S. price October 1936 to 1941 compared to highly profitable Government wartime price	395-829	395-829	Stocking and Watkins (1948:132-134)
8E. Same as 8A	U.S. price in 1928-1936 compared to Krupp's U.S. import price to two US exclusive importers and GE co-conspirators	886	886	<i>U.S. v. General Electric Co. et al (10/8/1948)</i>
8 F. Same as 8A.	Price 1928-35 compared to (inflated) price in Germany same years.	806	806	Canada (1945: 14)
8 G. Same as 8C.	Price 1936-39 compared to (inflated) price in Germany.	310	310	Canada (1945: 14)
8 H. Same as 8A.	Price 1928-1935 compared to (inflated) price in Germany.	243	243	Canada (1945: 14)
8 I. Same as 8C.	Price 1939 compared to (inflated) price in Germany.	50-321	50-321	Canada (1945: 14)
8 J. Same as 8A.	Price 1928-1935 compared to price in October 1941 after antitrust indictment by DOJ	1329	1329	Canada (1945: 14)
8 K. Same as 8C.	Price 1939 compared to price in October 1941 after antitrust indictment by DOJ	61-543	61-543	Canada (1945: 14)
8L. Same as 8A+8C (no distinction between two episodes)	Mean annual deflated wholesale prices during 1929-	429	700	Suslow (2005:734)

	1941, relative to 1926-28 average; peak is 1941			
9A. Bid rigging by three processors (Turner, Flav-O-Rich, and Prairie Farms) of <b>school milk</b> contracts, ½ pints of lowfat white milk, in Boone, Kenton, and Campbell Counties, Kentucky, 1984-1988; bid riggers won 20 of 22 contracts in 1987.	Benchmark is 1983 pre-collusion price of three riggers (\$0.12) ; May- Sept. 1987 is representative cartel period, avg. of 20 winning bid prices (\$0.141); peak is 1 <sup>st</sup> bid (\$0.153)	18.3	27.5	Lanzillotti (1996:Figure 7, p.442)
9B. Same as 9A.	Geographic yardstick is price (\$0.1156) in surrounding more competitive counties; May-Sept. 1987 is representative cartel period, avg. of 20 winning bid prices (\$0.141); peak is "LIVI" bid ( \$0.145)	22.0	26.1	Lanzillotti (1996:Figure 7, p.442)
9C. Bid rigging by three processors (Holland, U.C., and Ideal American) of <b>school milk</b> contracts, ½ pints of lowfat white milk, school districts in Boone, Kenton, and Campbell Counties, Kentucky, 1984-1988; bid riggers won 20 of 22 contracts in 1987.	Benchmark is 1980 pre-collusion price of 3 riggers (\$0.12) ; May- Sept. 1987 is representative cartel period, avg. of 20 winning bid prices (\$0.1417); peak is 1 <sup>st</sup> bid (\$0.153)	18.1	27.5	Lanzillotti (1996:Figure 7, p.441)
9D. Same as 9C	Benchmark is 1987 yardstick prices of non-colluding processors in adjacent counties (\$0.1095) ; May- Sept. 1987 is representative cartel period, avg. of 20 winning bid prices (\$0.1417); peak is 1 <sup>st</sup> bid ( \$0.153)	29.4	39.7	Lanzillotti (1996:Figure 7, p.441)
9E. Bid rigging by two processors (Meyer and Trauth) of <b>school milk</b> contracts, ½ pints of lowfat white milk, school districts in Boone, Kenton, and Campbell Counties, Kentucky, 1984-1988; author shows that for 3 years after conspiracy, duopoly and yardstick prices were identical	Benchmark is avg. 1984-88 yardstick prices of non-colluding processors in adjacent counties (\$0.1223) ; avg. winning prices of duopoly is \$0.1363); peak in 1988	11.5	21.9	Lanzillotti (1996:Figure 3c, p.433)
10A. Bid rigging <b>school milk</b> contracts, half pints, Dade and Broward counties, Florida, 1980-1985	Average 1986-89 post-conspiracy prices (\$0.145) is the benchmark vs. avg. 1980-85 price (\$0.164); peak is 1984 (\$0.17)	13.1	17.2	Lanzillotti (1996:Fig. 8a, 443)
10B. Same as 10A	Pre-conspiracy price (\$0.142) is the benchmark vs. avg. 1980-85 price (\$0.164); peak is 1984 (\$0.17)	15.5	19.7	Lanzillotti (1996:Fig. 8a, 443)
11A. Bid rigging <b>school milk</b> contracts, Tampa Bay area (three counties), Florida, 1980-1985	Average 1986-89 post-conspiracy prices (\$0.133) is the benchmark vs. avg. 1980-85 price (\$0.136); peak is 1985 (\$0.15)	2.3	12.8	Lanzillotti (1996:Fig. 8b, p. 433)
11B. Same as 11A	Pre-conspiracy price (\$0.132) is the benchmark vs. avg. 1980-85 price (\$0.136); peak is 1984 (\$0.17)	3.0	28.8	Lanzillotti (1996:Fig. 8b, p. 433)
12A. Bid rigging <b>school milk</b> contracts,	Yardstick is avg. price bid to	48.8	59	Lanzillotti (1996:

Danville, Kentucky 1983-1988; author shows that in nearby unaffected counties, state and school bids were nearly same during 1983-88	state agency in same county in 1983-88 (\$0.1045) vs. school district (\$0.1555); peak is 1988			Fig. 9c, p. 447)
12B. Same as 12A	Benchmark is 1989 post-cartel price (\$0.125) vs. school district (\$0.1555); peak is all years except 1986	24.4	27.2	Lanzillotti (1996: Fig. 9c, p. 447)
13A. Bid rigging <b>school milk</b> contracts, Owensboro, Kentucky 1983-1988; author shows that in nearby unaffected counties, state and bids were nearly constant.	Yardstick is avg. price bid to state agency in nearby counties in 1983-88 (\$0.1195) vs. school district (\$0.122); peak is 1988	2.1	4.9	Lanzillotti (1996: Figs. 8 and 9c, p. 447)
13B. Same as 13A	Yardstick is 1989 post-cartel price (\$0.125) vs. school district (\$0.1555); peak is all years except 1986	24.4	27.2	Lanzillotti (1996: Figs. 8 and 9c, p. 447)
14. Bid rigging <b>school milk</b> contracts, Kentucky “core conspiracy area,” 1981- 1988	Geographic yardstick is median price in surrounding competitive counties (\$0.117) vs. core conspiracy (\$0.1294); peak is 1986	10.4	35.1	Lanzillotti (1996:Fig 10a, p. 448)
15. Bid rigging <b>school milk</b> contracts, summary of several selected school districts of school-milk bid rigging in southeast of U.S., 1979-1988, 2 to 9 bid riggers; estimates prepared for trial and used for settlements, from among 109 specific cases listed; may include observations 9-14 above	Various methods used for observations numbered 9 to 14 above	15-20	--	Lanzillotti (1996:452)
16A. Price fixing of <b>nitrogen and nitrate</b> (nitrate of soda, ammonium sulfate), international private cartel, including some national cartels, formed July 1929 after four years of sharply falling prices; included Chilean miners’ national export cartel and UK and German producers of coke-byproduct and synthetic manufactures; collapsed 1931	Posner’s method not explained, and number cannot be found in original source (S&W 1946)	75	--	Posner (1975:818-820 and 2001:304), Stocking and Watkins (1946:163), Wallace and Edminster (1930: 54-56)
16B. Same as 16A	Ammonium sulfate average UK prices in 1932 compared with 1930 average	35	--	Stocking and Watkins (1946:163)
16C. Same as 16A	UK ammonium sulfate prices one month after collapse of cartel relative to last 6 months of cartel	43	--	Stocking and Watkins (1946:163)
16D. International cartel was reformed at end of 1932 and continued to operate until at least 1947; a period of rising demand	U.S. ammonium sulfate prices in 1933-39 relative to 1932 prices	24	38	Stocking and Watkins (1946:165)
16E. Same as 16D	Ave. UK ammonium sulfate prices in 1933-39 relative to 1932	15	21	Stocking and Watkins (1946:163-65)
16F. Same as 16A	Lerner index predicted from econometric model	42.9	--	Griffin (1989:189-190)
16G. Same as 16D	Lerner index	28.2	--	Griffin (1989:189-190)
17A. Second episode of price fixing of beet and cane <b>sugar</b> ; international quasi-private cartel comprised of “advisors” (mostly diplomats or civil servants) of the 21 governments with 85-90% of world sugar output and consumption;	Ave. prices on the London market in Sept. 1937-Sept. 1939, relative to 1935-36 prices	30	--	Posner (1975:818-820), Posner (2001:304), Stocking and Watkins (1946:46)

no treaty; began Sept. 1937, ended Sept. 1939; agreement froze the export shares of all exporting regions but also operated in part to placate consuming countries (i.e., buyers' cartel).				
17B. Same as 17A	Lerner index	6.4	--	Griffin (1989:189-190)
17C. Huge increases in global inventories and plunging prices from 1922 to 1932 was the main cause of the formation of international cane and beet sugar <i>exporters'</i> cartel of May 1931- Sept. 1935; a private agreement among national industry associations, with possible government encouragement/enforcement in the background, applied to the national sugar cartels of Cuba, Java, Peru, and five European countries to reduce output and set export quotas; no price agreement; global stocks fell 28%; Hexner calls this episode a dismal failure because importing countries outside the cartel boosted their production and self-sufficiency; Plummer says only Hungary passed legislation to enforce the agreement	Lerner index calculated by Griffin	14.9	--	Griffin (1989:189-190), Hexner (1946:192-193), Plummer (1934:20-23)
17D. Same as 17A+17C, but with no pause in collusion from 1935 to 1937	Mean annual deflated wholesale price 1931-38 relative to 1931 price; peak is 1931	0	0	Suslow (2005:733)
17E. Same as 17A+17C, but with no pause in collusion from 1935 to 1937	Mean annual deflated wholesale price 1931-38 relative to 1939 price; peak year 1931	13.9	100	Suslow (2005:733)
17F. Same as 17A	Mean 1938 price (2 <sup>nd</sup> episode) in London market compared to 1932 (before 1 <sup>st</sup> episode)	17.0	--	Stocking and Watkins (1946:51)
17G. Same as 17A	Mean 1933-36 prices in London market compared to 1932 (before 1 <sup>st</sup> episode)	11-16.5	--	Stocking and Watkins (1946:51)
18. Price fixing and territorial quotas of <b>aluminum</b> . Six episodes beginning Oct. 2, 1901 and ending early 1939.				Posner (1975:818-820), Posner (2001:304), Stocking and Watkins (1946:228), Eckbo (1976:33)
18A. The first international private cartel of the world's five sole manufacturers, all located in Western Europe, was formed by contract on Nov. 2, 1901 which was in effect until late 1906	Price in Europe in 1905 compared to early 1901	--	100, 100 <sup>b</sup>	Posner (1975:818-820), Posner (2001:304)
18B. Second international cartel episode; same membership as 18A, but a tighter contract signed in late 1906; members and outsiders added 200% more capacity in 1905-08; entry, excess capacity, and a late 1907 recession put stress on the cartel; it formally dissolved Sept. 30, 1908	Benchmark is German ingot prices in late 1908 relative to mid 1907; decline in part due to fall in demand	--	50	Stocking and Watkins (1946:233)
18C. Same as 18B	Author's interpretation of case studies of other researchers	50+	--	Eckbo (1976:33)

18D. Same cartel as 18B, but data are from a top manager of the cartel in its later years who is an apologist for the benefits of cartels	Exact transaction prices from 1906 to 1908 in gold French francs; the base of comparison is the price demanded by the cartel's French members in Jan. 1908 which would have guaranteed a good rate of return; cartel dissolved in April 1908 and prices fell far below the base price; peak is all of year 1907	83	167	Marlio (1947: 13)
18E. Same as 18A and 18B combined, but tracks prices in U.S. market; imports flood into the U.S. market in 1910-1912	Alcoa's U.S. prices in 1910-1912 compared to 1902-07 average cartel U.S. prices	65	82	Stocking and Watkins (1946:229,233)
18F. Third international cartel agreement reached June 12, 1912 (5 days after Alcoa accepted a DOJ consent decree to end an antitrust probe!); ended by outbreak of war in August 1914	Average annual U.S. price in 1913 versus 1912	5.0	--	Stocking and Watkins (1946:238-245, note 44)
18G. Same as 18F above	Average European transaction prices Jan. 1913 to Jan. 1915; peak is 1914; compared to same base price as in 18D above	30.4	33.3	Marlio (1947: 18)
18H. Prices fall after end of war prompting a 4th, unwritten cartel agreement in 1923; lasted until 1926; Alcoa hid its participation by forming a holding company for its burgeoning European assets which was controlled through its Canadian subsidiary; European members refrained from exporting to US and Alcoa did not export to Europe at less than cartel's prices	Method not explained and numbers not found in S&W; S&W refers to 1922-1924 price changes of 33% in Europe and 44% in the U.S.; Elliott considers 1923-25 boom "mainly" responsible for price increases	--	38,59 <sup>b</sup>	Posner (2001:304), Stocking and Watkins (1946:251), Elliott <i>et al.</i> (1937:256)
18I. Same as 18H above	Author's interpretation of case studies of other researchers	50+	--	Eckbo (1976:33)
18J. Fifth international private cartel, 1926-1930; unlike some others, this author interprets new cartel agreement in 1926 as start of a new episode; other authors consider 1924-1938 as one episode	Author's interpretation of case studies of other researchers	50+	--	Eckbo (1976:33)
18K. Sixth episode in Europe by 8 companies that owned a common joint venture, the Alliance Aluminum Co., lasted from July 1931 to early 1939; joint venture purchased and sold aluminum stocks to members; cost-saving technological change rapid in 1930s	London list or "official" price compared to the price members could buy out of Alliance Aluminum stocks; peak is Nov. 1931	45	75.1	Marlio (1947: 37-40)
18L. Same as 18K.	Transaction prices from Nov. 1931 to Dec. 1936 in gold French francs compared to Mar. 1938-Jan. 1939 (1.1 FF), a period the author, an expert insider, calls cooperative but not very effective; peak is Nov. 1931	83.6	101.2	Marlio (1947: 39-40)
18M. Same as 18K above	Author's interpretation of case studies of other researchers	50+	--	Eckbo (1976:33)
18N. Study that measures the U.S. market power of Alcoa during three episodes when it was a monopolist in the U.S. market (1923-	Econometric model with excellent data that measures short-run and long-run mark-up	59-65	--	Posner (2001:304), Suslow (1986: 399-400)

1940) partly because of agreements with European producers that limited imports	over Alcoa's U.S. marginal costs, including accounting profits			
18O. Same as 18J above	Compares average London metal price 1926-29 with price in late 1930 after US-Canadian entry	24.4	--	Oualid (1938:20-21)
18P. Same as 18K above	Average London price 1932-36 with July 1931 or late 1930	5.3-17.7	--	Oualid (1938:20-21)
18Q. Same as 18K above	Same as 18P, except base of comparison is price in "cartel-free" markets Belgium, Netherlands, and Central Europe	17.7-25	--	Oualid (1938:20-21)
18R. Same as 18A	Lerner index predicted from econometric model	203.0	--	Griffin (1989:189-190)
18S. Same as 18F	Lerner index predicted from econometric model	66.7	--	Griffin (1989:189-190)
18T. Same as 18J	Lerner index predicted from econometric model	44.9	--	Griffin (1989:189-190)
18U. Same as 18K	Lerner index predicted from econometric model	51.5	--	Griffin (1989:189-190)
18V. Same as 18A, but authors believe that 1904-07 prices were strongly affected by a boom in demand	European price change from 1900 to 1902	25	--	Elliott <i>et al.</i> (1937:226)
18W. Same as 18H above	Changes in prices in the US from 1922 to 1924	44	--	Stocking and Watkins (1946:251)
18X. Same as 18F	European prices in 1912-14 relative to competitive 1908-11 period	0-70	--	Elliott <i>et al.</i> (1937:228)
18Y. Same as 18H, except that transactions prices are taken from an exhibit from a private antitrust suit against Alcoa	Peak U.S. price in Dec. 1925 relative to 1920-21 when Alcoa faced large European import competition; adjusted for \$.03 rise in U.S. tariff in Sept. 1922	--	32	Elliott <i>et al.</i> (1937:255)
18Z. Same as 18H; author believes that over-capacity, increased scrap supplies, and depression caused prices to decline 20%; costs also declined by 20% 1926-1930/31	Cartel was able to bring off an "orderly reduction in prices" with no change in profits	0	--	Elliott <i>et al.</i> (1937:260)
18AA. Same as 18H above	Changes in prices in Europe from 1922 to 1924	33	--	Stocking and Watkins (1946:251)
18BB. Same as combination of 18H and 18J.	Average U.S. net realization prices in 1924-1938 compared to 1921-22; peak is 1937; includes Great Depression .	13	38	Stocking and Watkins (1946:229,252-269)
19. Bid rigging of Dallas-Fort Worth <b>school milk</b> contracts in 1980-1992 by 9 dairy processors, which paid a large settlement to end a civil suit.	Examines winning bids in DFW to those in San Antonio, Texas for several types of milk	5.0-6.0	--	Lee (1999)
20A. Price fixing of <b>crude rubber</b> international private cartel, London-based Rubber Growers' Assn., agreed in recession year 1920 to cut output by 25% in 1921; Dutch producers supported cut; in November 1921 UK and colonial legislatures made it a	World price change from just before cartel (1920- early 1921) to late 1921	--	100	Posner (1975:818-820), Posner (2001:304), Stocking and Watkins (1946:64-65)

mandatory government program; price effects were large from 11/21 to 1925-26, but no analysis presented here; UK government rubber-quota program encouraged expansion of Dutch East Indies production; by 1926-27 it was no longer effective; officially abandoned Oct. 1928				
20B. New scheme implemented June 1934-April 1944; the Intl. Rubber Regulation Cmte. in London with government and industry members set output and export limits, which were negotiated by Britain, Holland, France (and their colonies) and Siam; Suslow judges the IRRC to be a private cartel	Real world prices in 1934-39 compared to base years 1930-33; peak year is 1937	119	149	Suslow (2001: 57), Hexner (1946: 280-293)
20C. Same as 20B; IRRC based its price objective on covering full costs of production plus a rate of return on assets of about 7.5%; extensive studies of plantation costs in all areas were commissioned	Nominal prices 1936-1939 compared to upper limit of full costs of production	15-134	141	Hexner (1946: 287)
20D. Same as 20B	Lerner index	194.1	--	Griffin (1989:189-190)
20E. Same as 20B	Mean annual deflated wholesale prices for 1934-1939 relative to 1929-31; peak is 1937	138	287	Suslow (2005:732)
21A. Price fixing and quotas for <b>electric incandescent light bulbs</b> , international private cartel formed as Phoebus SA, incorporated in Switzerland, by contract on Dec. 23, 1924 by British, German, Dutch, Hungarian, Japanese, French, and U.S. companies; ended Sept. 1939; reestablished 1945-55, but weak after GE withdrew in 1945	Method not explained; cannot find such price change in the original source (S&W)	37	--	Posner (1975:818-820), Posner (2001:304), Mirow and Maurer (1982), Stocking and Watkins (1946:340-45)
21B. Same as 21A above	Prices of 25, 40, 60 Watt bulbs in Holland in 1938 relative to U.S. (yardstick) prices; average assumes 25 W accounts for 50% of market and other sizes 25% each	222	367	Stocking and Watkins (1946:344)
21C. Same as 21A above	Same as above except Germany vs. USA	140	220	Stocking and Watkins (1946:343)
21D. Same as 21A above	Same as above except Sweden vs. USA	77	110	Stocking and Watkins (1946:343)
21E. Same as 21A above	Compare (retail?) prices of 60W bulbs in Germany in 1929-30 with same bulbs before cartel began (1924-25); no adjustment for cost reductions	-11	--	Benni <i>et al.</i> (1930:75)
21F. Same as 21A above	Cartel price reduction in Sweden as new local lamp factory was being built in the early 1930s	27	--	Stocking and Watkins (1946:343 and footnote 106)
21G. Same as 21A	From Phoebus' records, average net 1937-38 manufacturers' prices in 8 W. European member countries, relative to Japan, the only nonmember in the world	322	--	UK Monopolies Commission (1951: 196)

21H. Same as 21A	Same as above for British Empire prices	281	--	UK Monopolies Commission (1951:196)
21I. Same as 21A	Same as above for Brazil	148	--	UK Monopolies Commission (1951:196)
21J. Same as 21A	Same as above for China	111	--	UK Monopolies Commission (1951:196)
21K. Same as 21A	Same as above for non-Phoebus Europe	276	--	UK Monopolies Commission (1951:196)
21L. Same as 21A	Same as above for rest of the world	214	--	UK Monopolies Commission (1951:196)
22A. European <b>copper metal</b> market was cornered by the “Secrétan” syndicate of four UK and French firms by signing long term supply contracts with major mines worldwide; thus, in effect, a global cartel; Sept. 1887-Mar. 1889; Mar. 1889 crash came after unexpected increases in mine output and recycled Asian supplies arrived.	London Metal Exchange prices in late 1888 compared with costs (mine contract prices held by syndicate); maximum price is compared to LME price at end of March 1889	31	129	Elliott <i>et al.</i> (1937:395)
22B. The “Amalgamated Pool” raised \$155 million to finance purchase large stocks of <b>U.S. copper metal</b> in April 1889; price rose in late 1901 and crashed at end of 1901 when pool owned 200,000 tons	Price in mid 1901 compared with end of 1901	35	--	Elliott <i>et al.</i> (1937:397-98)
22C. Amalgamated Copper Co. organized a US supply-control cartel in 1906; effective 1907-1912.	Average prices late 1907-1912 compared to 1906; peak effect was from early 1906 to “Panic of 1907”	35	127	Elliott <i>et al.</i> (1937:398)
22D. Copper Export Assn. was formed Dec. 1918 covering 95% of US production; it agreed (illegally) to reduce output by 42% during 1919; by 1923 large post-war govt. stocks were liquidated and it disbanded; 1923-26 was one of the few normal period in the copper market after 1913	Author’s estimate of price elevation late 1919 to 1923 above competitive levels in early 1919	29	--	Elliott <i>et al.</i> (1937:418-419)
22E. Price fixing of <b>U.S. copper metal</b> by Copper Exporters Inc., the only Webb-Pomerene Association to have foreign (non-U.S.) members [sic], effective October 1926 - May 1930, world prices; officially dissolved 1932 [preceded by 1888-1890 and 1918-1922 cartel episodes]	Method not explained; Posner cites Stocking and Watkins, but I cannot find Posner’s estimate in the original source (however, it is close to 22G below)	31	--	Posner (1975:818-820), Posner (2001:304), Stocking and Watkins (1948:125-131)
22F. Same as 22E above; world prices March 1929	Compared with average of 3 years before cartel contract signed	--	63.1	Stocking and Watkins (1948:127)
22G. Same as 22E; world copper prices in year following Great Crash, May 1929-May 1930; cartel lost control of prices after May 1930 when large African mines opened; formally dissolved in 1932	Same as above	38	--	Stocking and Watkins (1948:127)
22H. Same period as 22E; an early economic study of international cartels, most of them European based, that depends on information	World export prices in Dec. 1932 compared to peak period May 1929-April 1930	--	-72	Plummer (1934:149-152)

from previously published economic studies and press accounts; writing at the beginning of the Great Depression, the author is more impressed by the failures of cartels to raise prices than their successes; of scores of private cartels studied, only two have data on their price effects; international copper cartel maintained near monopoly over supply, but experienced rapidly falling demand and rising stocks				
22I. Same as 22B, but judged effective only from early 1899 to Dec. 1901; ended by lack of European cooperation and domestic cheating	New York wholesale prices 1899-1901 compared with 1898	31-64	--	Herfindahl (1959:81)
22J. Same as 22B	New York wholesale prices 1899-1901 compared with 1902-03	55-64	--	Herfindahl (1959:81-82)
22K. Same as 22C; Herfindahl is skeptical that any of the collusive arrangements alleged by other researchers in 1904-05, 1906-07, 1908, 1909, or 1912-13 were effective	New York wholesale prices 1904-13 compared with early 1906 benchmark	0	--	Herfindahl (1959:92-99)
22L. Same as 22D, except slightly shorter conspiracy period; the CEA was successful in restricting supply in 1921-22 and possibly in 1918-20 also.	New York wholesale prices 1921-22 compared with 1923-26 benchmark; price effects were weak and brief	1	--	Herfindahl (1959:92-99)
22M. Same as 22E above.	Compared world prices March 1929 with average of 3 years before cartel contract signed	--	63.1	Stocking and Watkins (1948:127)
22N. Same as 22E, except shorter effective period of 4/1929 – 4/1930	New York wholesale prices April 1929-April 1930 compared with competitive 1926-28	28	--	Herfindahl (1959:208)
22O. Same as 22N	New York wholesale prices April 1929-April 1930 compared with 1931	88	--	Herfindahl (1959:208)
22P. Same as 22D; a 1918-1922 (or 1924) U.S. Webb-Pomerene Assn. that liquidated large wartime (WWI) stocks, but may not have affected export prices	Lerner index	0	--	Griffin (1989:189-190), Hexner (1946:224)
22Q. Second <b>international copper</b> cartel (first is 22A); formed with exporters of all countries except Canada as members; active May 1935 – Sept. 1939; agreement on output reductions; New York export prices	Base price late 1934-early 1935 compared to 1938-1939 average price; peak price March 1937 affected by “war fever”	11-33	84	Stocking and Watkins (1948:129), Herfindahl (1959:115)
22R. Same as 22Q; London exchange prices, which S&W assert are better reflection of output and export quotas	Comparison of May 1937 price with May 1935 price	--	150+	Stocking and Watkins (1948:129)
22S. Same as 22Q; average annual prices of spot purchases of standard copper on the London exchange, in pounds sterling ; author believes that rise chiefly due to increased demand	Base is 1932-34 prices compared to 1936-39; peak is 1937	40	73	Hexner (1946: 228)
22T. Same as 22E; League of Nations copper price series; authors state that cartel aimed at a price of \$0.18/lb. and tried to stabilize market by reducing prices during early 1929 demand spike; it lost control of price after late April 1930	Price before contract signed compared to May 1929-mid April 1930 when cartel achieved its target price; peak was a few days in April 1929	29	71	Benni <i>et al.</i> (1930:21)

22U. Same as 22E above; second study of same cartel by League of Nations researcher, but 8 years later	Considers the cartel a failure because it could not control prices when demand dropped in early 1930 and African mines opened compare 1929 price with lowest in 1930s (1932)	--	-72	Oualid (1938:35)
22V. Same as 22Q above	Author believes that March 1935-Sept. 1936 primarily the result of quotas; but peak rise in Jan. 1937 heavily influenced by surge in demand	36.6	90.3	Oualid (1938:37)
22W. Same as 22E	Lerner index for 1926-1930	0	--	Griffin (1989:189-190)
22X. Same as 22Q	Lerner index for 1935-1939	0	--	Griffin (1989:189-190)
22Y. Same as 22Q above; author is careful to identify periods when demand was weak or strong enough to affect prices; 1936-38 were years with steady or mixed growth in demand	New York electrolytic quality copper, f.o.b. prompt delivery; change from 1931-34 to 1936-38 average; 1937 is peak year	37	67	Walters (1944:146)
22Z. Same as 22Q	Same as 22R above, except base year is 1934, the one with the most comparable demand conditions to 1936-38	50.3	83.2	Walters (1944:146)
22AA. Same as 22A; a Paris-based cartel operating in “the late 1890s” (probably 3/1887-3/89) had almost a monopoly, but “little effect” on prices	Method not explained	0	--	Jenks (1907:49)
22BB. The next-to-last (third) known phase of the <b>international copper</b> agreement (began ca. 1964, ended in 1966); members of the cartel agreed to sell “outside normal marketing channels” to certain preferred customers (who were forbidden to resell) at a lower price fixed for 2 years at a time; all other buyers purchased copper on the London Metal Exchange, which was manipulated by the cartel through occasional large purchases by the cartel on the LME; author hints at a U.S.-African agreement on exclusive territories	No estimates are available for non-U.S. sales; in the mid 1960s U.S. producers kept domestic prices higher than the yardstick: the “export” (LME) price	1	--	Kronstein (1973)
22CC. Same as 22E	Average 1929 prices compared to competitive 1923-26 prices or to Mar. 1932 price; peak was Mar. 1929	30	75	Elliott <i>et al.</i> (1937: 441)
22DD. Same as 22A	London cash prices during Jan. 1888-Feb. 1889, compared to either early 1887 and late 1889, respectively	75-118	--	Andrews (1889:509-514)
22EE. Last (4 <sup>th</sup> ) international copper cartel episode; lasted from 1968 to as late as 1988	Econometric model that predicts a Lerner Index	25.0	--	Griffin (1989:189-190)
22FF. Same as 22A	Econometric model that predicts a Lerner Index	51.5	--	Griffin (1989:189-190)
22GG. Same as 22D	Econometric model that predicts a Lerner Index	0	--	Griffin (1989:189-190)
22HH. Same as 22E	Econometric model that predicts a Lerner Index	0	--	Griffin (1989:189-190)
22II. Same as 22Q	Econometric model that predicts a Lerner Index	0	--	Griffin (1989:189-190)

22JJ. Same as 22A	London Metal Exchange prices from “late 1887” (before) to a few months later	--	100+	Prain (1975: 103)
22KK. Same as 22E, except that authors believe cartel not effective until after 9/1927	Price increase from before cartel effective (9/1927) to 3/1929	--	65	Wallace and Edminster (1930:261)
22. LL. Same as 22Q	Econometric model with emphasis on fringe producers	1.0	--	Montero and Guzman (2005:17)
23A. Bid rigging of purchases by municipalities <b>cast-iron pipes</b> , used for rail beds, culverts, drainage, or sewage; all U.S. states west and south of Pennsylvania and Virginia, circa 1895-1896; found guilty at trial; Judge Taft concluded that an f.o.b. plant price of \$13/t for 16” or smaller pipe and \$15/t for 30-36” pipe was sufficient for a reasonable profit	Dates, cities and method not explained, but probably judge’s reasonable profit benchmark; apparently Posner’s interpretation of this famous Supreme Court case	39	--	Posner (1975:818-820), Posner (2001:304), <i>U.S. v. Addyston Pipe</i>
23B*. Same as 23A for an Omaha, NE municipal tender for 512 pieces of 20” pipe in 12/1895	Trial documents reveal that a “premium” or “bonus” of \$23.40/ton (a profit yardstick) was the overcharge split among the cartel, whereas the delivered cartel price was \$15.40	52.0	--	<i>U.S. v. Addyston Pipe</i>
23C*. One of the episodes in 23A for a St. Louis, MO tender, exact date unknown	Bonus of \$6.50/t on a winning bid price of \$24/t	37.1	--	<i>U.S. v. Addyston Pipe</i>
23D*. Same as 23C	Bonus of \$6.50/t when the delivered but-for price was \$17 to \$18/t	36-38	--	<i>U.S. v. Addyston Pipe</i>
23E*. One of the episodes in 23A for an Atlanta, GA contract of 12/1895, size of pipe and winning bid not mentioned	Bonus was \$7.10/t; reasonable profit yardstick is the but-for price of \$13 to \$15/t	47-55	--	<i>U.S. v. Addyston Pipe</i>
23F*. One of the episodes in 23A ; average bonus of \$3.63 made by cartel from 6/1/1895 to 12/31/1895	Bonus relative to reasonable profit yardstick	20-21	--	<i>U.S. v. Addyston Pipe</i>
23G*. Some of the episodes in 23A; sales of So. Pittsburg Co. in WV, MI, and OH; a non-member of the cartel was located in Columbus, OH	Bonus varied from \$1/t to \$1.50/t; yardstick is reasonable profit price	5.6-8.8	--	<i>U.S. v. Addyston Pipe</i>
23H*. Some of the episodes in 23A; Chattanooga Co. generated a \$3/t bonus on all sales in West-central Tennessee	Yardstick is reasonable profit price	16.7-17.7	--	<i>U.S. v. Addyston Pipe</i>
23I*. Some of the episodes in 23A; in Jan. 1896 cartel made an average bonus of \$7 to \$8/t	Yardstick is reasonable profit price	39-47	--	<i>U.S. v. Addyston Pipe</i>
23J. Same as 23A	U.S. Appeals Court decision	35-43+	--	Appendix Table 4: entry 1 below
24. Sophisticated oligopoly model that measures sellers’ market power in the U.S. <b>crude petroleum and natural gas</b> markets 1947-1971; Appelbaum’s model does not distinguish tacit from overt collusion, but Posner asserts collusion; some members non-U.S.	Econometric model prediction of average mark-up on full marginal costs	6.5	--	Posner (2001:304), Appelbaum (1979:283)
25A. Mark-ups in the U.S. <b>automobile</b> industry; study is a general one of mark-up and productivity change; it does not distinguish overt from tacit behavior; oddly, 6 of 17 industry groups have higher average mark-ups	Morrison uses a large scale, sparsely specified, pooled 1953-1986 time-series econometric model of 18 major industry groups in	14	--	Posner (2001:304), Morrison (1990: 25,43)

than “automobiles” (e.g., chemicals is 61%); financial profits for the industry averaged only 3.2%; source is a 1990 NBER working paper, but results same in 1993 refereed journal paper	manufacturing, one of which is transportation equipment			
25B. Same as 25A above	Tables 2, 2A show mark-ups average 30.6%; Table 2A shows the largest mark-up of 38.5% in 1978	31	39	Morrison (1990: 25,43), Morrison (1993: Tables II and V)
26. Price elevation due to oligopoly market power from all sources (unilateral, tacit collusive, and overt collusive) in the U.S. <b>cigarette manufacturing</b> industry.	Large-scale, richly specified oligopoly econometric model fitted to 1955-90 data; focused on excise tax incidence; average wholesale price (with taxes) divided by the sum of variable production cost, advertising expenditures, and excise taxes	37	--	Posner (2001:304), Barnett <i>et al.</i> (1995: tables 1 and 3)
27. Price elevation due to all sources of market power (unilateral, tacit, or overt) of the U.S. <b>soft drinks bottling</b> industry (does not include the syrup makers like Coca-Cola)	A cross-sectional econometric model applied to 1972-1987 data on 40 food processing industries; Lerner index of market power is 3 <sup>rd</sup> highest and virtually tied with the 4 <sup>th</sup> and 5 <sup>th</sup> highest	60	--	Posner (2001:304), Bhuyan and Lopez (1997:1039-40)
28A. International patent-pooling cartel in <b>magnesium</b> metal market combined with exclusive supply contract by Dow Chemical with fabricator AMC (a General Electric affiliate), July 1927-1942, which raised prices to all U.S. buyers	Prices charged to all U.S. buyers 6/33-11/38 compared to yardstick of AMC’s prices or export prices	27-37	--	Stocking and Watkins (1946:295)
28B. Dates of cartel above are changed to Oct. 1932 (the date Alcoa signs a contract with I.G. Farben) to April 1942 (Alcoa, Dow and 3 others indicted by DOJ); U.S. cartel member pleaded <i>nolo</i> and paid fines; beginning in 1942, wartime price controls were imposed at levels to guarantee high profits	Real net prices charged by Dow Chemical to foreign customers during 1933 -1941 compared to 1942-1943; “after” prices more reasonable because of rapid cost reductions before and during earlier years of cartel; peak year 1933	9.4+	47	Suslow (2001:56), Stocking and Watkins (1946:274-303)
28C. Same as 28A for years 1927-1929	Lerner index	61.3	--	Griffin (1989:189-190)
28D. Same as 28B for years 1934-1937	Lerner index	33.3	--	Griffin (1989:189-190)
28E. Same as 28B	Mean annual deflated wholesale price for 1932-1943, relative to mean 1929-31 price; peak year 1932	0	0	Suslow (2005:731)
28F. Same as 28B	Mean annual deflated wholesale price for 1932-1943, relative to 1943 price; peak year 1932	22.6	58	Suslow (2005:731)
29. Auctions for U.S. <b>Forest Service timber</b> , 1975-1981, Pacific Northwest; evidence that buyers colluded against Forest Service; 108 auctions in an area with high timber density and several buyers; most other forest areas are less	Econometric model of collusion with supply effects; mean compared to model of competitive market price	5.7	--	Baldwin <i>et al.</i> (1997)

competitive				
30A. <b>School district milk-supply</b> -contract bid rigging in Cincinnati, Ohio by three dairies, 1980-1990, for 2% chocolate milk in pints; from a trial with finding of guilt	Average price of winning bids relative to competitive control group of dairies, effective years, from fitted econometric model; maximum is highest year	6.5	11.3	Porter and Zona (1999:263), Porter and Zona (2004:229)
30B. Same as 30A, except only for school districts in which a defendant was an incumbent in the previous year	Average price of winning bids relative to competitive control group of dairies, effective years, from fitted econometric model; maximum is highest year	24.6	49	Whinston (2006: 35); Porter and Zona (1999:263), Porter and Zona (2004:229)
31. Brokerage firms that in early 1990s were <b>market makers on the NASDAQ exchange</b> and that beginning May 27 or 28, 1994 no longer avoided "odd-eighth quotes" on the stocks of four large companies after exposure of the practice in newspapers; effect was to raise the price of brokerage services to stock traders. More than 20 of these market-maker paid then-record civil damages.	Comparison of bid/offer spreads on four stocks before and after 5/27/94 (i.e., "after" price)	50	--	Christie <i>et al.</i> (1994)
32. Winning bids in 134 construction contracts for Government of Korea <b>public works construction projects</b> worth more than \$10 million each, Jan. 1995-June 1998	Econometric model using forecasting approach	15.5	--	Lee and Hahn (2002:83)
33A. Bid rigging by three contractors on city contracts for <b>sewer construction</b> in a Southeastern U.S. city, late 1970s to Jan. 1980, from plaintiff's expert opinion prepared for a trial held in 1985-1988	Direct court testimonial evidence on City Project No. 67	18+	--	Howard and Kaserman (1989:389)
33B. Same as 33A	Three statistical models applied to six other projects (ratio, dummy variable, and forecasting methods)	27-41	--	Howard and Kaserman (1989:389)
33C. Same as 33A	Statistical model applied to Project No. 67	25-47	--	Howard and Kaserman (1989:389)
34A. Bid rigging in 2,014 No. Carolina and So. Dakota state <b>highway construction</b> projects, 1975-1982, with identity of some collusive firms certain and others suspected	Econometric model for NC price data	18	--	Werden (2003:2); Brannman and Klein (1992)
34B. Same as 34A	Econometric model, auction prices in SD	6.5	--	Werden (2003:2); Brannman and Klein (1992)
35. From well-known price-fixing trial, <i>U.S. v. Socony-Vacuum</i> , of 24 integrated <b>Midwest petroleum refiners</b> (of which 12 were convicted); agreement to restrict refinery output, March 1935-April 1936; prices are Midwestern spot 3 <sup>rd</sup> grade gasoline, 60-62 octane, f.o.b. Oklahoma	But-for prices are averages of 1934, 1933-34, or 1932-34; max. price was 5.4 ¢ per gal. in 12/35	23-31	36-46	Johnsen (1991:179)
36. Five firms pleaded guilty to bid rigging U.S. Dept. of Defense procurement contracts for <b>frozen fish</b> , 1981-Sept. 1989, consisting of three distinct episodes	Econometric model that uses post-conspiracy prices to:			Froeb et al. (1993:419-423)
36A. Same as 36, for 11/86-7/88 (103 bids)	Backcast period A	30	--	
36B. Same as 36, for 6/84-11/86 (74 bids)	Backcast period B	23	--	

36C. Same as 36, for 9/88-9/89 (44 bids)	Forecast period C	23	--	
37. Bakers of Washington State colluded on price of <b>white pan bread</b> from about 1954 to 1964; confirmed by a decision of the U.S. 9 <sup>th</sup> Circuit Court	Yardstick is conservative, the average U.S. retail price; maximum price difference is late 1958	15+	20.5	Mueller and Parker (1992:79)
38. An event study of the impact on stock prices of price-fixing indictments, mostly <b>U.S. manufacturing sector</b> , announced during 1962-1980 on 127 publicly traded U.S. firms in 57 conspiracies (out of 200 total); at least 85% pleaded guilty and were fined	Econometric study; estimated additional revenues from the conspiracies are compared to the companies' total sales;	8.7	--	Bosch and Eckard (1991: 315)
39. EU <b>carton board</b> cartel; manufacturers colluded on selling prices 1/86-12/91	EC decision to impose fines, 7/13/94, contains estimate	20-26	--	Connor(2003: Table A.5), Levenstein and Suslow (2002: 49), EC (7/13/94)
40. An international cartel in <b>iodine</b> was formed in 1878 by Chilean, English, and French companies; in the 1930s these companies and others from Germany, Italy, and Norway were linked by a common selling organization in London; Japanese producers joined in June 1937; ended in Sept. 1939	Eckbo's estimate is in a table, but he provides no discussion of his reasoning	50+	--	Eckbo (1967:37), Hexner (1946: 254-255)
41. <b>Ferry Operators</b> , English Channel Freight, raised prices to passengers, 10/92-12/92; EC fines	EC orders nullification of collusive rate increase	10	10	Levenstein and Suslow (2002:Table 15), Connor(2003: Table A.5)
42A. International <b>fine-art auction house</b> services 1993-2000, two firms convicted by U.S.DOJ, EU, and large (up to \$512 mil.) private plaintiffs' settlement; collusion began either 1/93 (plaintiffs' position) or 3/95 (DOJ's) and ended 2/2000; appears that both sellers' and buyers' fees were fixed.	Plaintiffs' assertion vetted by Levenstein and Suslow	0-20	--	Levenstein and Suslow (2002:Table 15)
42B. Same as 42A above	Information about changes in U.S. commission rates paid by all clients, buyers and sellers	91-200	--	Connor (2003: Table A.4)
42C. Same as 42A above; estimate for sellers' commissions (30% of revenues) increased to include buyers' commissions also; both commissions were basis of successful civil trial	Based on unchallenged testimony at US trial about Sotheby's increased profits of \$50-75 million, its market share (50%), and its revenues from seller's commissions only	104-168	--	Ashenfelter and Graddy (2002:section 6), Donovan (2005: 210)
42D. Same as 42A above, adjusted as for 42C	US Government's calculation of overcharge and affected commission revenues <b>of sellers' only</b> , accepted by judge for sentencing of Sotheby's owner	91-98	--	AP (4/23/2002), <i>NY Law J.</i> (4/23/2002), Donovan (2005: 210)
42E. Same as 43A above	Calculations of class-action lead counsel and defense counsel of total damages (\$286-\$300 million) and from transactions data on buyers' and sellers' commissions	94-100	--	Stewart (2001), Donovan (2005:209, 233)
42F. Same as 43A	Reading of the US court decision	50	150	Appendix Table 4: entry 9 below
42G. Same as 42A	EC decision gives internal	149-190	202	EC (Oct. 30, 2002:

	projection of likely revenue effect of raising the buyers' commission schedule; compared to revenues before collusion started; actual revenue increases in 1995-96 verify profit increases			¶104-105, 131-137)
42H. Same as 42A	Judge's decision in <i>Auction Houses Antitrust Litigation</i> : US settlement (\$512) was 1.8 to 4 times overcharge	25-47	--	Lande and Davis (2007: Case 2), Connor (2007a)
43. <b>Shipping conference</b> , France to Central & West Africa 1975-1992; fined by EC 4/1/92	From decision of the European Commission printed in the <i>Official Journal</i>	34-39	--	Levenstein and Suslow (2002:Table 15), Connor(2003: Table A.4), <i>EC Official Journal</i> L134 (5/18/92:3)
44. A 1952 U.S. court decision concluded that 3 beet-sugar refiners had conspired to undercharge <b>sugar-beet</b> farmers in the 1939-1941 crop years by \$0.25 /ton	Prices paid to growers by processors in 1939-1941, excluding Sugar Act payments; lowest (peak) price is from 1939	4.6	7.6	Adams and Bock (1980; 143-144)
45. U.S. jury trial concluded that grocery retailers in California had conspired from 1953 to 1970 to under pay their suppliers of <b>beef</b>	1953-1970 wholesale prices of beef compared the three years after the conspiracy terminated	47	65	Adams and Bock (1980; 145-146)
46A. Smelters of <b>vanadium ore</b> conspired to lower prices to certain Colorado miners in 1933-March 1948; a rare monopsony case; jury trial decision in 1961	But-for price was that paid for the same grade of ore at the same time by the U.S. Government	39?	--	Adams and Bock (1980; 146)
46B. Same as 46A	Reading of the court decision	22.5	38-47.5	Appendix Table 4: entry 18 below
47A. First international <b>platinum</b> cartel was formed in 1903; one UK and one French marketer of Russian metal; ended 1914	Average stabilized price 1905-14 compared to 1903	125	--	Elliott <i>et al.</i> (1937:152)
47B. Second intl. wholesalers' cartel formed 1920; included original 2 members plus one U.S. firm and "German interests"; ended in early 1931 after new mines began opening after 1927 in Russia, Columbia, So. Africa, and Canada	Cartel's peak effectiveness was 1920-1927; peak price of \$120/oz. reached in 1925; comparison is with price early 1931	--	336	Elliott <i>et al.</i> (1937:153)
47C. The second international platinum (a byproduct of gold, copper, or nickel mining) miners cartel was formed in 1918 by companies mining and smelting in Russia, UK, Canada, So. Africa, Columbia, Germany, and France; Russia withdrew in 1927; did not control substitute palladium prices; may be related to 47B	Real prices 1919-1927, compared to non-cartel period 1929-1931; peak is 1924	74	122	Suslow (2001: 56), Hexner (1946: 235-237)
47D. The third international platinum miners' cartel began Oct. 1931 with establishment of Consolidated Platinums Ltd. in London which managed export quotas and set refined metal prices; probably collapsed 1933	Real prices in 1932-1933 compared to 1930-31; 1932 is peak year	4.6	11	Suslow (2001: 56), Hexner (1946: 235-237)
47E. Same as 47D above	Real prices in 1932-33 compared to 1935-38 or to 1935 alone because 1936-38 had better demand conditions	3.8-28.0	10-36	Suslow (2001: 56), Hexner (1946: 235-237)

	than 1935			
47F. Same as 47C	Lerner index, econometric model	75.4	--	Griffin (1989:189-190)
47G. Same as 47D	Lerner index, econometric model	11.1	--	Griffin (1989:189-190)
47H. Same as 47B, but Suslow judges the end date to be 1928 instead of 1931	Mean annual deflated wholesale price for 1919-1928, relative to 1919 price; peak year 1924	27.1	64	Suslow (2005:731)
47I. Same as 47B, but Suslow judges the end date to be 1928 instead of 1931	Mean annual deflated wholesale price for 1919-1928, relative to 1928-29 price; peak year 1924	29.4	67	Suslow (2005:731)
47J. Same as 47D	Mean annual deflated wholesale price for 1932-35, relative to 1930-31 price; peak year 1932	0	13.3	Suslow (2005:731)
47K. Same as 47D	Mean annual deflated wholesale price for 1932-35, relative to 1935-36 price; peak year 1932	3.5	17.2	Suslow (2005:731)
48A. <b>Electric power equipment (generating and transmission)</b> , bid rigging against U.S. electric utilities on 20 products with total affected sales of about \$14.7 billion (possibly largest in U.S. history); collusive period 3/1950 to 12/1960; for some products began in 1930s but data available only for 1/1948 to 12/1960; average overcharges of about \$175 million per year in 1950s, 29 corporations pleaded guilty in 1960 and paid fines of almost \$2 million, almost 2000 private treble-damages suits filed with settlements of over \$400 million	Result of five-year study by joint committee of Congress; average price increases on all products from pre-cartel prices	9-10	--	Carlton and Perloff (1990:213-216), U.S. Congress (1965)
48B. Same as 48A; widely cited study by FTC staff members; covers eight of the most important product classes out of 20 that were cartelized; the authors divide the conspiracy period into three sub periods (1950-1954, 1955, and 1956-59)	Econometric model applied to data from special survey of 70 firms in industry, 553 annual observations 1950-1970; overcharge calculated for 1950-1954	6.7	--	Carlton and Perloff (1990:216), Lean et al. (1985:836)
48C. Same as 48A	Same as 48B, except overcharge during a temporary lapse in cartel discipline called the "White Sale" of 1955	2.8	--	Carlton and Perloff (1990:216), Lean et al. (1985:836)
48D. Same as 48A	Same as 48B, except final collusive episode of 1956-1959	3.7	--	Carlton and Perloff (1990:216), Lean et al. (1985:836)
48E. Same as 48A ; <b>Turbine electric generator</b> ; estimated from quarterly transaction prices 1948-1963 from industry trade association; Sultan concludes that conspiracy was "ineffectual" (p ix) and had no "measurable impact on price... when measured with the dummy variable technique" (p.111); yet hidden in an appendix is a Version II model cited by Carton and Perloff that includes both direct and indirect effects; this analysis finds positive 1960-72 price differences, which seem to be	Very complex econometric simulation model that compares average 1955-59 prices with and without conspiracy effects; average price differences are much larger in 1958-1960 than after 1960; maximum effect is 1960	8-9	49	Carlton and Perloff (1990:216), Sultan (1975:346-348)

due to tacit behavior				
48F. Same as 48A ; <b>Large electric power transformers</b> 1947-late 1959	Simple comparison of defendants' transaction prices with the 10 quarters of prices after the cartel was prosecuted; peak prices 1956	30-38	90	Kuhlman (1967: 553)
48G. Same as 48A; a journalistic monograph of the U.S. electrical equipment conspiracy based on interviews, court proceedings, and Congressional hearings	Comparison of "book" (list collusive ) prices in 1950-1954 with late 1949 and early 1955 price war "discounted" prices, all products	--	40-45	Smith (1963: 110)
48H. Same as 48A above, but for one product, <b>large electrical circuit breakers</b>	Benchmark price in winter of 1957-1958 price war among members of the electrical circuit breakers cartel, compared to previous book prices 1950-1956	60	60	Smith (1963: 112)
48I. Same as 48A above, <b>large electrical switchgear</b>	Same as 48H above for 1958 prices	--	40-45	Smith (1963: 114)
48J. Same as 48A and E, except 1950-1959 period; decision from a bench trial in <i>Ohio Valley Electric v. General Electric</i>	Judge compared actual prices paid with post-conspiracy prices and adjusted the price difference downward to account for a number of changes in demand and supply conditions	21	--	Finkelstein and Levenbach (1983)
48K. Same as 48A, except <b>steam turbine generators</b> 1950-1960; estimates made by two academic economists in late 1962 working for the Anti-Trust Investigation Group, a consortium of 164 plaintiffs' counsel for the 1,912 treble-damage suits;	But-for prices were before, during, during, and after (1948, 1950, 1955, and 1961) with the last year giving the largest overcharges; analysis used both list prices and buyers' prices paid from 1948 to end of 1961 and corrected price increases for labor and material costs; "conservative" Blue Book figures used all four years	10-11	--	Bane (1973:217-219)
48L. Same as 48A and H, <b>large circuit breakers</b> 1956-1959	Same as 48K above	28	--	Bane (1973:217-219)
48M. Same as 48A and K above, <b>large power transformers</b> 1956-1959	Same as 48K above	37	--	Bane (1973:217-219)
48N. Same as 48A and K above, except <b>watt-hour meters</b> 1956-1959	Same as 48K above	13	--	Bane (1973:217-219)
48O. Same as 48A; result of a jury trial in 1964 in <i>Philadelphia Electric v. General Electric et al.</i> for a mix of products purchased by the plaintiff	Jury decision on actual damages	8.7	--	Bane (1973:314)
48P. Same as 48A; result of a bench trial in 1964 in <i>Ohio Valley Electric v. General Electric et al.</i>	Bench decision on actual damages	11	--	Bane (1973:314)
48Q. Same as 48A; result of a court's special master's analysis, Prof. Kessel of the Univ. of Chicago, in <i>Atlantic City Electric v. I-T-E Circuit Breaker</i> trial; plaintiffs included Gulf State and Kansas City Power and Light; after the Special Master's report was issued, I-T-E quickly settled	Range of estimates is for different mix of purchases by two utilities	21-24	--	Bane (1973:217-219)

48R. Same as 48A and E	Previous estimate in 48E is from the text; this one is from Table A18.4 for 1955-59	13.3	--	Sultan (1975:348)
48S. Same as 48A, but in <i>Ohio Valley Electric Corp. v. General Electric Co.</i> , 244 F. Supp. 914 (SDNY 1965) the court found that there was bid rigging against the Ohio Valley Electric Corp.	Reading of the court decision	10.9	--	Appendix Table 4: entry 13 below
49A. Classic empirical study of the Joint Executive Committee, a famously unstable U.S. <b>railroad</b> cartel that fixed prices and market shares on transport from <b>Chicago to East Coast</b> cities for 328 weeks from 1880 to 1886 prior to the passage of the Sherman Act; JEC had 4 members until Oct. 1883 when a 5 <sup>th</sup> joined cartel	Average price increase during “cooperative periods” identified by the JEC’s detailed internal records	66	--	Porter (1983)
49B. Same as 49A; an econometric analysis of the Joint Executive Committee, one of the most intensely examined cartels in history; the model specifies both demand and supply relationships and, unlike Porter (1983), corrects for serial correlation	To derive the average equilibrium price during collusive periods, one must solve the supply equation for logP in terms of estimated coefficients	50.8	--	Ellison (1994: Table 2 p.42), Ellison (2003)
49C. Same product market as 49A, except for 1871-74 duopoly period prior to the JEC period; distinguishes between “warm” months when Great lakes shipping via Buffalo was competitive and “cold” months when ships could not sail.	Author’s econometric model uses 1871-1898 data on 56 semiannual observations of real prices of grain shipments; controls for a few railroad costs and demand factors; “winter” (cold weather) rates	24.4	--	Briggs (1989:201)
49D. Same as 49C above	Same as 49C above except rates when there was a large fringe of ships competing with two railroads in warm months	19.5	--	Briggs (1989:201)
49E. Same as 49A above; the period of interest is during operation of the JEC when there were 4 and then 5 members in the cartel	Econometric model estimates that cold-weather and warm-weather rates have the same price effects	15.5	--	Briggs (1989:201)
49F. Same as 49A	Same as above except warm-weather rates	15.5	--	Briggs (1989:201)
49G. Same as 49A; model is based on weekly prices; has two equations solved simultaneously, which allows for feedback effects; covers only the JEC cartel period; has a greater array of controls for demand and supply shifters, including market concentration	Alternative model specifications result in some variation in the estimated coefficient for price; larger effects are highly significant	13.7-30.8	--	Briggs (1989:203)
50A. <b>Quebracho (tanning agent)</b> cartels organized voluntarily by about 20 Latin American and 1 UK firm in four agreements 1916-17, 1919-22, 1926-31, and 1935-44; sellers’ cartels were “reinforced by decrees of the Argentinean and Paraguayan governments”; nevertheless, the cartel’s U.S. agents were prosecuted by the DOJ in 1942; this analysis refers to the 3 <sup>rd</sup> episode	New York import prices for 1926-30 compared to 1923-25 “before” prices from Hexner (1946)	5	--	Hexner (1946: 281), Suslow (2001: 57), Wallace and Edminster (1930:359-361)
50B. Same as 50A above, except for 2 <sup>nd</sup> episode, years 1919-1922	Real prices in 1920-22 taken from Berge (1944) compared with 1924-1925; peak is 1920	12.4	15	Suslow (2001: 57), Berge (1944: 112-120)

50C. Same as 50A above	Real prices in 1926-31 compared with 1924-1925 and with 1932-34; peak is 1930	26	45-60	Suslow (2001: 57), Berge (1944: 112-120)
50D. Same as 50A above, except for 4 <sup>th</sup> episode, years 1935-1942	Real prices in 1935-39 compared with 1932-34; peak is 1939	23	35	Suslow (2001: 57), Berge (1944: 112-120)
50E. Same as 50A above	NY import prices for 1935-39 compared to 1932-33	52	--	Hexner (1946: 281)
50F. Same as 50A above	Eckbo's interpretation of Hexner and information from the 1942 U.S. antitrust indictment	50+	--	Eckbo (1976: 38-39), Hexner (1946: 279-281)
50G. Same as 50A above, but Eckbo extends dates to 1934-1946	Same as 50F above	50+	--	Eckbo (1976: 38-39), Hexner (1946: 279-281)
50H. Same as 50A above; information from Congressional testimony in 1942 and from court documents when six trading companies pleaded <i>nolo</i> in 1942	Last of six price increases from Nov. 1934 to Jan. 1941, compared to pre-Nov. 1934 price	--	95	Berge (1944:118)
50I. Same as 50A	Real prices in 1926-31 compared with 1932-34; peak is 1930	40	45-60	Suslow (2001: 57), Berge (1944: 112-120)
50J. Same as 50B	Mean annual deflated wholesale price for 1920-24, relative to 1920 price; peak year 1920	0	0	Suslow (2005:732)
50K. Same as 50B	Mean annual deflated wholesale price for 1920-24, relative to 1923-25 price; peak year 1930	17.8	46.7	Suslow (2005:732)
50L. Same as 50A	Mean annual deflated wholesale price for 1926-32, relative to 1923-25 price; peak year 1930	10.2	28.9	Suslow (2005:732)
50M. Same as 50A	Mean annual deflated wholesale price for 1926-32, relative to 1932-33 price; peak year 1930	25.5	46.8	Suslow (2005:732)
50N. Same as 50D	Mean annual deflated wholesale price for 1933-39, relative to 1932-33 price; peak year 1939	20.3	0	Suslow (2005:732)
50O. Same as 50D	Mean annual deflated wholesale price for 1933-39, relative to 1939 price; peak year 1939	0	0	Suslow (2005:732)
51. <b>Ready-mix concrete</b> bid-rigging cartel in Denmark, January 1994 to January 1996; prices on several grades from 18 sites; collusion was facilitated by detailed price reports issued by the Danish Competition Authority that made previously secret discounts known to sellers; study controls for costs; no mention of prosecution	Average prices compared to quarter before new government price reporting began	19	25	Albaek <i>et al.</i> (1997:433,440)
52A. Bid rigging of English oral <b>auctions</b> of 340 quality-graded <b>used 1988 Chevrolet Caprice police cars</b> , New York City, January	Ratio approach statistical analysis of Howard and Kaserman (1989); mean of	17.1	22.4	Nelson (1993:385)

1990-May 1991; alleged bidding ring active in 3 of 13 auctions; reduced price received by City of NY; civil case settled out of court	three auctions			
52B. Same as above	Dummy variable model following Howard and Kaserman (1989); from Equation 1	16.6	21.4	Nelson (1993:390)
53. Bid rigging ring in Washington, DC of 680 <b>houses sold at public auction</b> (mortgage foreclosures or NISI proceedings), Jan. 1967-August 1990, followed by English “knockout” auctions among ring members to distribute profits; reduced prices received by DC govt.; 6 members pled guilty, 6-9 found guilty at trial	Econometric model with almost perfect fit to sample of bids by members found guilty at trial; model accounts for complex profit payout system	32.5	146+	Kwoka (1997: Tables 1 and 2)
54. Regional market power of AMPI <b>dairy cooperative</b> with 30,000 members; concerns 1972-April 1975 period (up to date of DOJ consent decree) power over farm milk prices	Econometric dummy-variable model of the price premium in markets with average market shares, relative to post-decree margin, as a proportion of U.S. average blend price of farm milk	3.0-4.0	--	Madhavan <i>et al.</i> (1994: Tables 1 and 4)
55. Intensive case studies of 40 cartels in <b>UK manufacturing</b> before and after the 1956 antitrust legislation and Restrictive Practices Court decisions from 1959 and later made 85% of the sample cartels illegal. Despite strong demand increases and moderate inflation in early 1960s, 39 of 40 cartels showed significant price declines.	Change in nominal wholesale UK prices reported by sellers or major buyers from 1956-59 price levels to various periods following first negative Court ruling in 1959	0-30	--	Swann <i>et al.</i> (1974: 156-57, 166)
56. Same as 55 above, UK <b>wire ropes</b> , non-marine, 1956-59	Price 36 months after negative ruling	15.3	--	Swann <i>et al.</i> (1974: 156-57, 166)
57. Same as 55 above, UK <b>porcelain sanitary bathroom fixtures</b> , 1956-59	12 months after	20.0	--	Swann <i>et al.</i> (1974: 156-57, 166)
58. Same as 55 above, UK <b>steel pipes, sewage and drainage</b> , 1956-59	36 months after	25.0	--	Swann <i>et al.</i> (1974: 156-57, 166)
59. Same as 55 above, UK <b>rubber and plastic coated cable</b> , 1956-59	6 months after	25-30	--	Swann <i>et al.</i> (1974: 156-57, 166)
60. Same as 55 above, UK <b>small electric motors</b> , 1956-59	36 months after	20-25	--	Swann <i>et al.</i> (1974: 156-57, 166)
61. Same as 55 above, UK <b>electric meters</b> ; probable bid rigging against government electricity-generating companies	72 months after, as reported by one buyer	15.0	--	Swann <i>et al.</i> (1974: 156-57, 166)
62. Same as 55 above, UK <b>carpets</b> , mechanically woven, 1956-59	Up to 10 years later	0	--	Swann <i>et al.</i> (1974: 156-57, 166)
63. Same as 55 above, UK <b>iron bath tubs</b> , 1956-59	Average 1965-69 prices	30+	--	Swann <i>et al.</i> (1974: 156-57, 166)
64. Same as 55 above, UK <b>steel drums</b> , 1956-59	Average 1960-69 prices	--	10	Swann <i>et al.</i> (1974: 156-57, 166)
65. Same as 55 above, UK <b>electricity transformers, largest sizes</b> ; probable bid rigging against government electricity-generating companies, 1956-59	Average 1960-1970 prices	--	25	Swann <i>et al.</i> (1974: 156-57, 166)
66. Same as 55 above, UK <b>electricity transformers, system</b> and distribution; probable bid rigging against government electricity-generating companies, 1956-59	Average 1960-1970 prices	--	25-41	Swann <i>et al.</i> (1974: 156-57, 166)
67A. The U.S. <b>Sugar Trust</b> was formed in	The increase in gross margins	6-14	15	Jenks (1900:133-

Nov. 1887 and was first effective in eastern U.S. until the large Spreckels factory in Philadelphia opened in mid 1889; collusion is signaled by a rise in the gross margin from its pre-cartel level of \$0.50 to \$0.75/lb. When the trust gave up trying to drive the new entrant out of the market in 1900, margins returned to normal until 1914.	in 1888-89 divided by the average wholesale price in the three years before Trust was formed; peak is Sept. 1889; UK and German yardsticks show no technological change affecting prices			145), Jenks and Clark (1929: 82-98)
67B. Same as 67A, except a 2 <sup>nd</sup> episode that began in early 1892 when the Trust bought out Spreckels; episode ended when a new rival firm appeared in Sept. 1898	The increase in gross margins in 1892 to mid 1898 relative to average price 1/1892-9/1898; peak is ca. June 1896	7-9	16	Jenks (1900:133-145)
67C. From “narrative evidence,” weekly memos of meetings of the Sugar Institute, a trade assn. of the 14 U.S. <b>cane sugar</b> refiners from Dec. 1927 to 1936 when Supreme Court declared it to be an illegal cartel; Institute achieved higher prices solely through collusion on trading rules, in face if increasing competition from beet sugar and imports	Comparison of prices in relatively competitive period 1926-27 (Lerner Index was 0.031) to cartel period (Lerner ave. 0.085 and monopoly index 0.110) and adjusts for only source of cost changes (raw cane sugar)	6.3	11.9 (calculated to be 95% of monopoly price)	Genesove and Mullin (2001:382), Levenstein and Suslow (2001: 42)
67D. same as 67C above	But-for price is from 1937-1939	1.1	--	Genesove and Mullin (2001:382)
67E. Same as 67A; Eastern U.S. Sugar Trust Am. Sugar Refining Co.’s market share fell from 91% in 1892 to 71-86% in 1893-97 to below 62% after 1901; study finds 4 periods of effective collusion, but they do not appear to be different episodes.	From a quantitative NEIO model fitted to 1890-1914 price, demand, and cost data; elasticity-adjusted Lerner indexes significantly greater than zero for 1893-1897, between two price wars; peak 1893	23.4	29	Genesove and Mullin (1998:368)
67F. Same as 67A	Elasticity-adjusted Lerner indexes significantly greater than zero for 1901-02	15.5	20	Genesove and Mullin (1998:368)
67G. Same as 67A	Elasticity-adjusted Lerner indexes significantly greater than zero for 1908	7	--	Genesove and Mullin (1998:368)
67H. Same as 67A	Elasticity-adjusted Lerner indexes significantly greater than zero for 1913	3	--	Genesove and Mullin (1998:368)
68. History of several brief early attempts (beginning in 1847, 1862, and 1885) at forming national <b>zinc</b> cartels in France and Belgium that held stocks of zinc off the market to raise prices; the first was “successful” for 13 years (viz., 1847-60), the others were not.		--	--	Devos (1994)
68A. The first national episode was “successful” for 13 years (viz., 1847-60), the others were not.	Historical case study, but no price data discussed; method unclear	1	--	Devos (1994)
68B. First <i>international zinc</i> export cartel (and 4 <sup>th</sup> episode) began 1910, ended Sept. 1914; included all the largest firms in AT, BL, UK, FR, DE, and NL with 62% of world production; the large US market was protected by tariffs.	No prices available, but characterized by Plummer as a “weak” cartel	1	--	Plummer (1934:102), Benni <i>et al.</i> (1930)
68C. Second international <b>zinc</b> cartel (5 <sup>th</sup> episode); organized like 68A, but began Sept. 1928, revised in Jan. 1929, and dissolved Dec. 1929 because market price stayed above its	A “weak” cartel also, presumably because of the cartel’s low target prices	1	--	Plummer (1934:102), Benni <i>et al.</i> (1930)

target price; members signed only 3-month contracts				
68D. Same as 68C; Griffin gives different dates for the 2 <sup>nd</sup> international <b>zinc</b> cartel: May 1928-late 1929	Lerner index estimated from an econometric model	37.0	--	Griffin (1989:189-190), Hexner (1946:249)
68E. Same as 68C; members included all major European producers; monthly agreements on production cuts of 5% to 10%; no control over new electrolytic-zinc process factories and friction between vertically integrated and nonintegrated members	European prices from Mar. 1929 to lowest level in May 1931	63	--	Elliott <i>et al.</i> (1937)
68F. The 3 <sup>rd</sup> intl. cartel: a revival of the 1928-29 European cartel with Australia and Canada added; output adjusted every 3 months if price exceeded or fell below £24/t; mid 1931-1934 (or 1935)	Lerner index estimated from an econometric model	14.9	--	Griffin (1989:189-190), Hexner (1946:249), Plummer (1934:102-103)
68G. Same as 68F; beginning in July 1931 and continuing through 1933, European producers reduced production to 45% below rated capacities; stocks reached normal levels by 1933 causing prices to rise through mid 1934; end date unclear	No precise data provided, but analysis consistent with 68E above	1	--	Elliott <i>et al.</i> (1937:764)
68H. Historical case study based on internal memorandums of 4th international <b>zinc</b> cartel; the <b>Zinc Producers Group</b> of 22 companies in Australia, UK, Germany, France, Spain, and Canada; formally in operation from 1945 to 1975 using output restraints, purchases of stocks, list price targets, and manipulation of the zinc contracts on the London Metals Exchange; refers to 1945 to about 1963	Examination of cash prices on the London Metals Exchange, but method of analysis unknown	0	0	Tsokhas (2000: Table 1)
68I. Same as 68H, except July 1964 to Dec. 1968	But-for price is 1960-62 or 1961-63 average f.o.b. cash prices on the London Metals Exchange compared to July 1964 - Dec. 1968 average; peak is 1965 average	39-46	53	Tsokhas (2000: Table 1)
68J. Same as 68H, except 1969 to 1975	Examination of cash prices on the London Metals Exchange, but method of analysis unknown	0	0	Tsokhas (2000: Table 1)
68K. Same as 68A, except the second national episode (1862-?) was “unsuccessful.”	Historical case study, but no price data discussed; method unclear	0	--	Devos (1994)
68L. Same as 68A, except the third national episode (1885-?) was “unsuccessful.”	Historical case study, but no price data discussed; method unclear	0	--	Devos (1994)
69A. Same companies (from 6 countries), conduct, and time period as 68H above, except for the <b>Lead Producers Group</b> ; price increases effective only in 1965-1967.	Base period is 1960-64 or 1961-65 LME cash contract prices; collusive period is 1965-1967; peak is 1966	34-53	49-69	Tsokhas (2000: Table 2)
69B. <b>Lead</b> cartel, all leading mining and smelting companies in 8 countries, signed an agreement 11/1/38, abandoned 9/39, but considerable doubts about whether agreed reductions in sales were ever implemented	London spot exchange prices Nov. 1938 to August 1939	0	--	Hexner (1946: 230)
69C. International <b>lead</b> cartel 1921-1923	Lerner index from econometric	20.5	--	Griffin (1989:189-

	model			190)
69D. This author states that there were no (effective?) international agreements prior to April 1931, the month by which London prices had declined by 60% since 1929; in 1930 and 1931 the Lead Producers' Association cut non-US production by 80-85%	Production quotas caused late 1931-1932 prices to rise above the lowest previous price observed in June 1931	10-50	--	Elliott (1937:662)
69E. Same as 69A, but for years 1945 to 1964	Examination of cash prices on the London Metals Exchange, but method of analysis unknown	0	0	Tsokhas (2000: Table 2)
69F. Same as 69A, but for years 1968 to 1975	Examination of cash prices on the London Metals Exchange, but method of analysis unknown	0	0	Tsokhas (2000: Table 2)
69G. Same as 69A; refers to Rio Tinto-led cartel from 1964 to 1976; share of world production was very low -- about 55%	Cartels tried to manipulate prices on the London Metal Exchange; no method cited	0	0	MacKie-Mason and Pindyck (1987: 210)
70A. South African <b>cement</b> cartel fixed prices and quotas from at least 1922 to 1994; adopted a multiple basing-point pricing system in 1956; legally exempted after 1986 by the So. African Competition Board, which reversed its position in 1995; Leach's extensive apologia of cartels fails to criticize the Natal-import episode	Prices set by cartel in Natal area compared to bulk prices charged by a new importer of Spanish cement in 1984-85; cartel later cut prices in Natal by 24% and drove importer out of business	5-10	--	Fourie and Smith (1994:130), Leach (1994), Levenstein and Suslow (2001: 42)
70B. Same as 70A above	Authors derive average 1972-1990 mark-up by comparing cement price-cost margins with those in buildings-materials mfg. and all manufacturing	17-26	--	Fourie and Smith (1995)
71. Historical/political-science study of the So. African <b>gem diamond</b> cartel, the Diamond Syndicate, that got control of all major mines in 1888 and began to reduce sales in that year; news reports say that the cartel gave up supply control around 1998 in favor of a new strategy that emphasizes building the De Beers brand.	Prices in 1889 to 1890 compared to 1888	50	80	Spar (1994), Levenstein and Suslow (2001: 42)
72A. A <b>mercury</b> export cartel ("Mercurio Europeo") organized in 1928 by one Spanish and two Italian mines, each with partial or full government ownership; together with a side agreement with a Mexican mine, the cartel controlled 60-70% of world exports in late 1940s; cartel reserved home markets for each company and operated exports through joint sales agents first in Switzerland, later in London and in the importing countries; interrupted briefly by Spanish Civil War in 1936	Eckbo's interpretation of case studies by others; prices may refer to export markets that were subject to antitrust actions	50+	--	Eckbo (1976:33), Hexner (1946: 232-233); MacKie-Mason and Pindyck (1987:192-203)
72B. Same as 72A above, except for 1939-1949; in late 1949 one Italian mine was accused of cheating on a sale to the U.S. government stockpile; the Spanish mine cut prices to the Italian mine's cost of production for 10 months in 1951	Eckbo's interpretation of case studies by others; ; prices may refer to export markets that were subject to antitrust actions	50+	--	Eckbo (1976: 33), Hexner (1946: 232-233); MacKie-Mason and Pindyck (1987:192-203)
72C. Same as 72B above from period when sole selling agency was established in London	Eckbo's assumption on the basis of the UK nationalization	50+	--	Eckbo (1967: 40)

until it was nationalized by the UK government in 1942				
72D. Same as 72A; from an early economic study of international cartels, most of them European based; writing at the beginning of the Great Depression, the author is more impressed by the failures of cartels to raise prices than their successes; of scores of private cartels studied, only two have data on their price effects, one of them the international mercury cartel, which controlled 88% of global supply in 1927 and 58% in Aug. 1932, during a period of rapidly falling demand	Price change from May 1931 to August 1932 in UK, from information in previously published economic studies and press accounts; author interprets failure to stop fall in prices as evidence of ineffectiveness	--	-58	Plummer (1934:149-152)
72E. Same as 72A above, except dates of operation are 1926-30; in 1931 mercury cartel control dropped to 57%; prices are minimum ones from annual League of Nations series	Average 1926-30 prices compared to relatively competitive 1932-35 period; peak is 1926	99	126	Oualid (1938:22-23)
72F. Same as 72A and 72B combined	Lerner index, econometric model	108.3	--	Griffin (1989:189-190)
72G. Same as 72A, except 1954-1970	Lerner index, econometric model	270.4	--	Griffin (1989:189-190)
72H. Same as 72A, except 1975-1982	Lerner index, econometric model	42.9	--	Griffin (1989:189-190)
72I. Same as 72B	Average 1947-1949 world export prices are compared to 1950 price; peak is 1947	3.3	11.2	MacKie-Mason and Pindyck (1987:192-203)
72J. Same as 72B	Average world export price 1947-1949 compare to conservative estimate of costs of production of high-cost mine in cartel; peak is 1947	20.4	29.6	MacKie-Mason and Pindyck (1987:192-203)
72K. Same as 72G for slightly different 1951-1970 period	Average 1951-1970 world export price compared to the 1950 price; peak is 1965	191.7	407	MacKie-Mason and Pindyck (1987:192-203)
72L. Same as 72G for slightly different 1951-1970 period	Average 1951-1970 world export price compared to average total costs of production; peak is 1965	239.9	490	MacKie-Mason and Pindyck (1987:192-203)
72M. Same as 72H	Average 1951-1970 world export price compared to non-cartel 1972 price; peak is 1965	94.7	239	MacKie-Mason and Pindyck (1987:192-203)
72N. Same as 72H	Authors use a formal cartel model and estimates of elasticities to predict the peak 1965 price for the Italian member of the cartel	--	391	MacKie-Mason and Pindyck (1987:202)
72O. Same as 72H	Authors use a formal cartel model and estimates of elasticities to predict the peak 1965 price for the Spanish member of the cartel	--	454	MacKie-Mason and Pindyck (1987:202)
73A. From 1897 to 1919, the German <b>potash</b> cartel, the Deutsche Kali Syndikat, which contained a mix of private and state-owned mines, had a near monopoly on world exports; Newman states that industry was nationalized and all producers compelled to join the cartel in	In June 1909 the cartel's contract expired and three dissident members signed contracts with U.S. importers at prices well below the 1908-early 1909 U.S. c.i.f. import	45+	--	Newman (1948:578), Schroeter (1994), Tosdal (1916)

April 1919; Schroeter judges that the cartel began as early as 1876 and that the Prussian state began controlling the cartel in late 1910; Tosdal believes start date is 1879	price			
73B. Same as 73A above	As interpreted by Levenstein, prices in 1910 reached “double average costs”	--	50+	Levenstein (2000), Schroeter (1994), Spar (1994), Levenstein and Suslow (2001: 42)
73C. Same as 73A above	German price of chloride of potash in 1878 compared to the 1896-1906 average	55	--	Levy (1927:295)
73D. Same as 73A above	Estimates price-cost margin in 1910 to be 200%; costs appear to be close to LRMC	100+	--	Schroeter (1994:76)
73E. First international potash cartel formed in August 1924, after deep price cuts during 1919-1923; voluntary agreement between the German and French national (both were government-controlled) cartels to set prices and quotas (70%, 30% respectively) for U.S. exports; in 1929 the only significant U.S. producer was secretly bought by the German cartel; lasted in its original form until 1932; overcapacity was cut and the industries rationalized, causing production costs to decline in 1920s and 1930s; no cost changes in 1920s	U.S. import prices of Manure salts (20% potash) set at start of cartel compared to competitive 1909-10 U.S. import prices	25.8	--	Newman (1948: 583), Schroeter (1994:77), Wallace and Edminster (1950:105)
73F. Same as 73E above	Same as 73E for muriate of potash (51% potash)	42.7	--	Newman (1948: 583)
73G. Same as 73E above	Same as 73E for sulfate of potash (49% potash)	50.7	--	Newman (1948: 583)
73H. Same as 73E above	Change in U.S. import prices from September 1924 to May 1929 for manure salts	65.2	--	Newman (1948: 583)
73I. Same as 73E above	Change in U.S. import prices from September 1924 to May 1929 for muriate of potash	12.4	--	Newman (1948: 583)
73J. Same as 73E above	Change in U.S. import prices from September 1924 to May 1929 for sulfate of potash	11.4	--	Newman (1948: 583)
73K. Second international cartel; Polish producers were added in 1932 as members and given a 4% export share; Spanish production expanded rapidly under French and British ownership from 1932 to 1934 when it captured 33% of U.S. market	Prices of U.S. imports in 100%-potash-equivalents fell from 1933 to 1934 because of Spanish entry into the world export market	71.6	--	Newman (1948: 584)
73L. Third international cartel; signed a new agreement with Spanish producers in 1935 giving them 15% export share; outbreak of Spanish Civil War in 1936 reduced Spain's exports; Russia and Palestine added in 1936; probably ended Sept. 1939; convicted in US	Same as 73E above for years 1934 to 1937-1941	37.7	--	Newman (1948: 583)
73M. Authors view 1st, 2 <sup>nd</sup> , 3rd international potash cartels 1926-35 (73E + 73K + 73L) as one cartel	Compare average 1927-35 German potash prices with price in 1926; peak is 1934	24	33	Oualid (1938:26)
73N. Same as 73M	Compare 1926-35 French prices with 1926; peak is 1927-	40	46	Oualid (1938:26)

	29			
73O. Same as 73M	Lerner index	56.3	--	Griffin (1989:189-190)
73P. Same as 73E; Schroeter ascribes price increase to a renewed agreement in May 1925 that adjusted the French-German export quotas and set of 50-50 common sales agencies in the importing countries.	Berlin potash prices in late 1925 compared to 1924 and early 1925 prices	50+	--	Schroeter (1994:78)
73Q. Same as 73E	Average Berlin prices in 1928-1932 relative to 1924 prices	55-65+	--	Schroeter (1994:80)
73R. Polish potash mines opened in 1927 and were admitted to intl. cartel with a national hegemony and a 4% export share in 1932; Russian cartel entered with a 10% quota in April 1934; but failure to incorporate large Spanish production from 1932 to May 1935 was the cause of a price crash in 1934-35	Berlin prices in 1928-32 relative to 1934-35; peak price in 1931	73	89	Schroeter (1994:80)
73S. Same as 73E; in May 1935 Spanish producers were allotted a national hegemony and a 15% world export share; U.S. producers made a secret agreement in 1935 to follow the intl. cartel's prices, for which they were found guilty in US court in 1940	Berlin prices in 1936-37 after Spain joined cartel compared to 1934-35	26	--	Schroeter (1994:78)
73T. Same as 73A	Compares prices in 1908 with prices offered during cartel suspension on two-year 1909-1910 contracts to US importers	25-40	40	Wallace and Edminster (1950:97)
73U. Same as 73E	Compares average 1926-28 muriate of potash US import prices with period of weak cartel power 1924-25; peak is 1928	7.8	13.5	Wallace and Edminster (1950:105)
73V. Same as 73E	Compares average 1926-28 potash sulphate US import prices with period of weak cartel power 1924-25; peak is 1928	6.1	11.3	Wallace and Edminster (1950:105)
73W. Same as 73E	Compares average 1926-28 manure salt US import prices with period of weak cartel power 1924-25; peak is 1928	19.2	27.4	Wallace and Edminster (1950:105)
73X. Same as 73E	Compares average 1926-28 kainite of potash US import prices with period of weak cartel power 1924-25; peak is 1928	22.0	30.3	Wallace and Edminster (1950:105)
73Y. Same as 73A.	Yardstick is prices (approx. 1900-1910) of profitable German mines not in cartel	30	--	Tosdal (1916:830)
73Z. Same as 73 E.	Compares North American import prices in 1924-33 with the price after the cartel fell apart in 1934.	107-110	--	Canada (1945: 3)
73AA. Same as 73 L.	Compares North American import prices in 1937-39 with the price before in 1934.	57	--	Canada (1945: 3)
74A. International <b>steel</b> cartel centered in	Prices in Germany above world	33	--	Levenstein and

Western Europe in 1930s; cartel raised prices in domestic markets of members, but sold abroad at lower, possibly competitive prices; this study seems to cover two episodes below (74B and 74C)	price, apparently from Barbezat's studies; Baker applies a general oligopoly model to U.S. data from 1933-39; Gallet's model refers to oligopoly pricing in the US 1950-1988			Suslow (2002:12,42), Barbezat (1989, 1990, 1994), Baker (1989), Gallet (1997)
74B. First international steel cartel of Sept. 1926-March 1931	S & W conclude that it "...lacked power over prices"; Benni et al. agree with S&W for most of the period; peak is Sept. 1928-March 1929	1	20	Stocking and Watkins (1946:203), Benni <i>et al.</i> (1930:14)
74C. Second international steel cartel of June 1933- Sept. 1939	This reorganized cartel was bigger and more successful than the first, but its power over price cannot be disentangled from the recovery of the world economy from the Great Depression	?	?	Stocking and Watkins (1946:182-211)
74D. Same as 74C	Lerner index	38.9	--	Griffin (1989:189-190)
74E. Same as 74C, but League of Nations prices collected f.o.b. Antwerp in pounds sterling, which author states are the same as found all over continental Europe	Average prices July 1933-Oct. 1936 compared to either Jan. or April 1933	9.3-17.5	--	Oualid (1938:40)
74F. Same as 74A	Lerner index	13.6	--	Griffin (1989:189-190)
75. International <b>lysine</b> cartel June 1992-July 1995, prosecuted and sanctioned by the U.S., EU, Canada, and Mexico; global cartel with two episodes separated by a disciplinary price war from about May 1993 to Sept. 1993.				
75A. First episode began in June 1992 and ended about April 1993 when a brief price war began; cartel bickered about market shares	Selling prices in U.S. relative to LRMC in U.S. of \$0.75 to \$0.80 per lb.	7.9-15.1	22.5-30.7	Connor (2001b, 2004)
75B. Second and more effective episode began in Oct. 1993 when members finally agreed to constant world volume-of-sales shares and a fifth small producer joined the cartel; ended June 1995	Change in U.S. prices from intermediate price war in early 1993 to late 1993 peak prices; from a trade journal	--	67	Levenstein and Suslow (2003:50), <i>Chem. Market Reporter</i> 7/17/95
75C. Seems to be an average of both episodes, 75A and 75B	Official estimate of US overcharge during 1992-95, combined with court records of U.S. affected sales	17.1	--	OECD (2003:55)
75D. Same as 75C	Selling prices in U.S. relative to U.S. LRMC	17.6	56	Connor (2001b, 2004)
75E. Same as 75C	Econometric model of the U.S. lysine market	17.6-18.0	56-57	Morse and Hyde (2000)
75F. Same as 75C, except Canadian market data	Benchmark is pre-cartel Canadian prices	22	--	Connor (2001b,2003: Table A.1)
75G. Same as 75C, except EU data	Benchmark is average pre-cartel EU price	17	--	Connor (2003: Table A.1), EC decision of 6/27/2000
75H. Same as 75C, except world market	Benchmark is pre-cartel world prices	14	--	Connor (2001b, 2003: Table A.1)
75I. Same as 75A, except Asia and Latin America data	Residual analysis from 75D,F,G, and H above	8	--	Connor (2001b, 2003: Table A.1)

75J. Same as 75F	Magazine article; Canadian peak prices	--	50	Levenstein and Suslow (2002:Table 15)
75K. Same as 75C	Prediction of US price change due to collusion from a dynamic simulation model of the lysine industry that focuses on the role of ADM's entry	24.6	--	De Roos (2004a:50)
75L. Same as 75C , except imports to selected developing countries	Import price decline after the demise of the cartel	10	--	Yu (2003:10)
75M. Same as 75C	Reading of U.S. court decision	--	71.4	Appendix Table 4: entry 21 below
75N. Same as 75C	Prediction of change in US mark-up from a dynamic simulation model	45.6	--	De Roos (2004b: Table 3, Model 1)
75O. Same as 75C	Prediction of change in US mark-up from a dynamic simulation model	44.1	--	De Roos (2004b: Table 3, Model 2)
75P. Same as 75C	Sophisticated GARCH econometric model applied to US prices	33.3	--	Bolotova <i>et al.</i> (2005)
75Q. Same as 75B	Selling prices in U.S. relative to LRMC in U.S. of \$0.75 to \$0.80 per lb.	39.9-49.3	53.8-64.0	Connor (2001b, 2004)
75R. Same as 75B	Compares EU selling prices with intervening price war benchmark	36.4	51.2	Connor (2003: Table A.1), EC decision of 12/5/2001
75S. Same as 75C	Changes in world prices compared to pre-cartel prices	--	41	Levenstein and Suslow (2003:49), <i>The Observer</i> 10/25/98
75T. Same as 75A	Compares U.S. transaction prices to 3 months before cartel began	23.3	40.0	Connor (2003: Table A.1)
75U. Same as 75B	Compares U.S. transaction prices to 3 months before cartel began	59.9	75.7	Connor (2003: Table A.1)
75V. Same as 75A	Compares U.S. transaction prices to 3 months during brief price war	23.3	40.0	Connor (2003: Table A.1)
75W. Same as 75B	Compares U.S. transaction prices to 3 months during brief price war	59.9	75.7	Connor (2003: Table A.1)
75X. Same as 75A	Compares EU selling prices with pre-cartel benchmark	10.0	22.3	Connor (2003: Table A.1), EC decision of 12/5/2001
75Y. Same as 75B	Compares EU selling prices with pre-cartel benchmark	34.7	48.9	Connor (2003: Table A.1), EC decision of 12/5/2001
75Z. Same as 75A	Compares EU selling prices with intervening price war benchmark	11.7	51.2	Connor (2003: Table A.1), EC decision of 12/5/2001
75AA. Same as 75C	Prediction of US price above marginal cost due to collusion, from a dynamic simulation model of the lysine industry that focuses on the role of	61.5	140	De Roos (2006:Table 3, Fig. 7)

	participants' asymmetries			
75BB. Same as 75A	Prediction of US price above marginal cost due to collusion, from a dynamic simulation model of the lysine industry that focuses on the role of participants' asymmetries	75	120	De Roos (2006: Fig. 7)
75CC. Same as 75B	Prediction of US price above marginal cost due to collusion, from a dynamic simulation model of the lysine industry that focuses on the role of participants' asymmetries	100	140	De Roos (2006: Fig. 7)
76A. International <b>citric acid</b> cartel, met from Mar. 1991 to May 1995; convicted and fined in the U.S. and EU; global cartel with only one episode	Transaction prices in US compared to a range of long run full economic costs	16-20	18-33	Connor(2001a and 2001b), Connor (2003: Table A.1)
76B. Same as 76A	Benchmark is pre-cartel prices in Canada	19-32	--	Connor (2003: Table A.1)
76C Same as 76A	Benchmark is pre-cartel prices in EU	45-50	--	Connor (2003: Table A.1), EC decision of 12/5/2001
76D. Same as 76A	Benchmark is pre-cartel world prices	30-34	--	Connor (2003: Table A.1)
76E. Same as 76A	Official U.S. government estimate, method not reported	31.25	--	OECD (2003:55)
76F. Same as 76A	Statement of EC Commissioner M. Monti 9/13/00 after fines imposed	--	50	Levenstein and Suslow (2003:50), <i>European Report</i> 9/13/00
76G. Same as 76A	Developing countries' import prices decline after the demise of the cartel	20	--	Yu (2003:10)
76H. Same as 76E	Sophisticated GARCH econometric model applied to US prices	13.6	--	Bolotova <i>et al.</i> (2005)
77A. International <b>sorbates</b> cartel 1979-1997, successfully prosecuted by U.S. DOJ, Canada, EU, and private plaintiffs in U.S.; global cartel with only one episode	Press report from anonymous source on US price effects	14	--	Levenstein and Suslow (2003:50), <i>WSJ</i> 10/1/98
77B. Same as 77A	Benchmark is pre-cartel and post-cartel U.S. prices from trade magazines	35-45	--	Connor (2003: Table A.1), <i>Chem. Market Reporter</i> (various dates)
77C. Same as 77A	Same as above for Canada	37-47	--	Connor (2003: Table A.1)
77D. Same as 77A	Same as above, world prices	42	--	Connor (2003: Table A.1)
77E. Same as 77A	Trade journal.; simple increase in U.S. transaction prices	--	14	Levenstein and Suslow (2002:Table 15)
78. International cartel in <b>methionine</b> , Feb. 1986 to Feb. 1999, successfully prosecuted by EU and large private settlements in U.S.; global cartel with three episodes	Benchmark is pre-cartel U.S. prices from trade magazine sources for entire conspiracy period 2/86-2/99 (3 episodes)	10-14	--	Connor (2003: Table A.1), Borgeson (1999), STAT-USA (1999)
78A. From 2/86 to 9/88 (first episode) all four major world suppliers agreed to both list and	Prices unavailable in EC report, but infer that EU price	30-90	--	<i>EC Official Journal</i> L255 (10/8/2003):1-

“rock bottom” (contract) prices everywhere in world; US and Japan were duopolies; fringe small; CR4 =92%; EC report says price increase highest of 3 episodes	increases are somewhat higher than for 78B below			32;
78B. From 9/88 to July 1990 (2 <sup>nd</sup> episode) Sumitomo withdrew from meetings of cartel but may have cooperated passively with cartel of 3 firms; nonmember Monsanto had 18-20% global share in late 1980s but in 1988 began aggressive expansion of liquid methionine in US; Russian producers increased exports to EU, but price effects weakly positive	U.S. list or spot prices for 99% pure DL-methionine in dry form for 1990 compared to 1980 and 1985 benchmark; long-term supply contract prices track spot prices very closely	26-78	--	<i>EC Official Journal</i> L255 (10/8/2003):1-32; Borgeson (1999:77)
78C. From July 1990 to Feb. 1999 (3 <sup>rd</sup> episode), Sumitomo not in cartel but sold its product through the cartel in the EU; in 6/93 cartel got an agreement from Russian suppliers to limit their EU imports to 75Kt;	Narrative of meetings gives both EU target and transaction (“going”) prices from mid 1990 to Feb. 1999; overstated benchmark (proxy for pre-cartel price) is mid 1990 price; peak is mid 1993	13.5+	15.6+	<i>EC Official Journal</i> L255 (10/8/2003):1-32
78D. Same as 78C for US prices	Average U. S. import prices 1991 to 1997 compared to 1981-84 prices; peak is 1997	14.1	37	Connor (2003: Table A.1), Borgeson (1999), STAT-USA (1999)
78E. Same as 78C for US prices	Same as above but benchmark is 1990 import prices	37.5	65	Connor (2003: Table A.1), Borgeson (1999), STAT-USA (1999)
78F. Same as 78C for US prices	U.S. list or spot prices for 99% pure DL-methionine in dry form for 1991-1998 compared to 1980 and 1985 benchmark; long-term supply contract prices track spot prices very closely; peak is 1997	38-95	40-99	Connor (2003: Table A.1), Borgeson (1999:77)
78G. Same as 78C	List prices in the EU from July 1990 to Feb. 1999, using July 1990 price as a benchmark (well above pre-1986 prices)	13.5	15.6	EC (Oct. 8, 2003)
78H. Same as 78C	Econometric model using world trade prices during and after the cartel	22-24		Levenstein <i>et al.</i> (2008: Tables 6 and 7)
79. International <b>sodium chlorate</b> cartel formed by exporters from Switzerland, Sweden, Italy, Germany, France, and Czechoslovakia 1931; ended in Sept. 1939	Real mean annual wholesale prices in 1931-1939 compared to nearly constant prices in 1920-1930, a period of relatively robust demand; peak year 1934	45	67	Suslow (2001: 58), Hexner (1946: 339-340)
80. International cartel in 15 <b>bulk vitamins</b> and Carotenoids, various dates between 1988 and 1999; prosecuted by U.S. DOJ, EC, CBC, ACCC, and private plaintiffs in U.S. and Canada; global cartel with different product and time episodes				
80A. <b>All vitamins</b> in US, late 1989-Feb. 1999 <sup>a</sup>	Press report of U.S. class-action counsel estimate	20	--	Levenstein and Suslow (2002: Table 15)

80B. Same as 80A for Canada, late 1989-Feb. 1999 <sup>a</sup>	Statement of CBC officials	30	--	Levenstein and Suslow (2002:Table 15)
80C. <b>Vitamin E</b> in US, Jan. 1990-Feb. 1999	Analysis of U.S. list or spot prices before cartel operated	55-65	82-90	Connor (2003: Table A.1), Con-nor (2001a:322-330)
80D. <b>vitamin B1</b> in US, Jan. 1991- Dec. 1994	Analysis of U.S. list or import prices pre-cartel	9-11	16	Connor (2003: Table A.1)
80E. <b>vitamin B2</b> in US, Jan. 1991- Dec. 1995	Analysis of U.S. list or import prices before and after cartel for vitamin B2	12-19	21	Connor (2003: Table A.1)
80F. <b>vitamin B5 (calpan)</b> , Jan. 1991- Dec. 1998	Analysis of U.S. list or spot prices before cartel	25	59	Connor (2003: Table A.1), Con-nor (2001a:322-330)
80G. <b>folic acid (B9)</b> , in US Jan. 1991- Dec. 1994	Analysis of U.S. list or import prices before cartel for folic acid (a B vitamin)	23	38	Connor (2003: Table A.1), Con-nor (2001a:328)
80H. <b>vitamin C</b> , in US Jan. 1991-Dec. 1995	Analysis of U.S. list or import prices pre cartel	10-23	31	Connor (2003: Table A.1), Con-nor (2001a:322-330)
80I. <b>vitamin B3 (niacin)</b> , in US Jan. 1992-March 1998	Analysis of U.S. import prices before cartel	33	71	Connor (2003: Table A.1), Con- nor (2001a:329)
80J. <b>vitamin B12</b> , in US, Jan. 1991- Dec. 1994	Analysis of U.S. list or spot prices pre cartel	13	73	Connor (2003: Table A.1)
80K. <b>beta carotene</b> , in US Jan. 1991- Dec. 1998	Analysis of U.S. list or import prices pre cartel	25-35	--	Connor (2003: Table A.1)
80L. <b>vitamin B12</b> in Canada, Jan. 1991- Dec. 1994	Analysis of Canadian list or import prices pre cartel	14	72	Connor (2003: Table A.1), Con-nor (2001a: 322-330)
80M. <b>Vitamin A</b> for world, late 1989-Feb. 1999 <sup>a</sup>	Analysis of world list prices pre cartel	25-30	--	Connor (2003: Table A.1, 2001: 322-330)
80N. Same as 80D, <b>vitamin B1</b> , world, Jan. 1991- Dec. 1994	Analysis of world list prices before cartel	9-10	--	Connor (2003: Table A.1, 2001: 322-330)
80O. Same as 80E, <b>vitamin B2</b> , world, Jan. 1991- Dec. 1995	Analysis of world list prices before cartel	12-19	--	Connor (2003: Table A.1, 2001: 322-330)
80P. Same as 80F, <b>vitamin B5</b> , world, 1/1991-12/1998	Analysis of world list prices before cartel	25	--	Connor (2003: Table A.1, 2001: 322-330)
80Q. <b>vitamin B6</b> , world, Jan. 1991- Dec. 1994	Analysis of world list prices before cartel	4-40	--	Connor (2003: Table A.1, 2001: 322-330)
80R. Same as 80G, <b>folic acid (B9)</b> , world, 1/1991 – 12/1994	Analysis of world list prices before cartel	23	--	Connor (2003: Table A.1, 2001: 322-330)
80S. Same as 80H, <b>vitamin C</b> , world	Analysis of world list prices before cartel	11-23	--	Connor (2003: Table A.1, 2001: 322-330)
80T. Same as 80K <b>beta carotene</b> , world	Analysis of world list prices before cartel	25-30	--	Connor (2003: Table A.1, 2001: 322-330)
80U. Same as 80K <b>other Carotenoids</b> in US	Analysis of U.S. list prices before cartel	9-13	--	Connor (2003: Table A.1, 2001: 322-330)
80V. Same as 80K <b>other Carotenoids</b> , world	Analysis of world list prices before cartel	25-30	--	Connor (2003: Table A.1, 2001: 322-330)
80W. Same as 80I <b>vitamin B3</b> , world	Analysis of world list prices before cartel	33	--	Connor (2003: Table A.1, 2001: 322-330)
80X. Same as 80J <b>vitamin B12</b> , world	Analysis of world list prices before cartel	33	--	Connor (2003: Table A.1, 2001: 322-330)
80Y. Same as 80A; 90 importing nations; with or without anticartel laws; model predicts	Trade model is fitted to international trade data; covers	19.7	60.5	Clarke and Evenett (2002: Table 7)

quantity and price effects of the global vitamins cartel ; total overcharge is \$2,626 million	the years 1985-1997 (misses last 14 months of cartel); converted into 2000 U.S. dollars; simple average of 90 overcharges on imports			
80Z. Same as 80A and 80Y above for 24 countries identified by the OECD as having effective anticartel laws during the affected period (a possibly generous designation)	Weighted average of 24 overcharges on vitamins imports; peak is for South Africa.	22.8	150	Clarke and Evenett (2002: Table 7)
80AA. Same as 80A and 80Y above, but excluding five countries authors believe did not effectively enforce their laws during most of 1989-1999: So. Africa., China, Romania, Peru, Bulgaria, Zambia.	Simple average of 19 countries	13.2	60.5	Clarke and Evenett (2002: Table 7)
80BB. Same as 80A and 80Y above for 20 largest countries with no anticartel laws	Simple average, as above	30.1	34.8	Clarke and Evenett (2002: Table 7)
80CC. Same as 80A and 80Y above for 20 no-antitrust countries in 80BB plus 5 mentioned in 80AA	Simple average, as above	33.0	60.5	Clarke and Evenett (2002: Table 7)
80DD. Same as 80A for South Korea, 1990-99	Comparison of 1997 import price relative to 1990, year before cartel	70.0	--	KFTC (2003: 2)
80EE. Same as 80A and 80DD	Comparison of 1997 import price relative to 2000, year after cartel	38.4	--	KFTC (2003: 2)
80FF. Same as 80H; vitamin C in US; one of the weakest and least durable of the vitamins cartels because of large Chinese exports	Sophisticated simulation model estimated with accurate industry parameters that predicts "no collusion" price of \$27/kg. and collusive price with Chinese fringe of \$33	22.2	--	de Roos (2001:20)
80GG. Same as 80H and 80FF	Same as 80FF except that but-for price of \$29.96 is from noncooperative oligopoly regime; peak price assumes no fringe	22.3	29.5	de Roos (2001:28)
80HH. Same as 80H and 80FF	Same as 80 GG except that but-for price of \$29.00 is punishment-phase price war	26.3	33.8	de Roos (2001:28)
80II Same as 80Q, <b>vitamin B6</b> , Jan. 1991-Dec. 1994	Analysis of U.S. list or import prices before and after cartel	7-28	19	Connor (2001a:326)
80JJ. <b>Vitamin D3</b> , 1992-1998, but end date is slightly uncertain	Analysis of U.S. list or import prices before cartel	36	47	Connor (2001a:323)
80KK. Same as 80H, vitamin C in US	Analysis of U.S. list or import prices after cartel	10	21	Connor (2001a:326)
80LL. Same as 80Q and 80II, vitamin B6 in US	Analysis of U.S. list or import prices after cartel	48	79	Connor (2001a:326)
80MM. Same as 80D, vitamin B1 in US	Analysis of U.S. list or import prices after cartel	50	59	Connor (2001a:326)
80NN. Same as 80I, vitamin B3 in US	Analysis of U.S. list or import prices after cartel	16	33	Connor (2001a:329)
80OO. Same as 80M, vitamin A in EU	Average annual 1991-98 EU transactions prices in euros vs. before (1990) prices; peak is 1998	25.0	40	EC (2001:86)
80PP. Same as 80C, vitamin E in EU	Average annual 1991-98 EU transactions prices in euros vs.	51.9	67.2	EC (2001:86)

	after (1999) prices; peak is 1998			
80QQ. Same as 80C, vitamin E in EU	Average annual 1991-94 EU transactions prices in euros vs. after (1999) prices; peak is 1998	10.6	19.2	EC (2001:86)
80RR. Same as 80D, vitamin B1 in EU	Average annual 1991-94 EU transactions prices in euros vs. before (1989-90) prices; peak is 1993	4.6	16.4	EC (2001:87)
80SS. Same as 80D, vitamin B1 in EU	Average annual 1991-98 EU transactions prices in euros vs. after (1996-99) prices; peak is 1993	62	79	EC (2001:87)
80TT. Same as 80E, vitamin B2 in EU	Average annual 1991-94 EU transactions prices in euros vs. before (1990) prices	19.4	30	EC (2001:87)
80UU. Same as 80E, vitamin B2 in EU	Average annual 1991-98 EU transactions prices in euros vs. after (1997-99) prices	29.9	35	EC (2001:87)
80VV. Same as 80F, vitamin B5 in EU	Average annual 1991-94 EU transactions prices in euros vs. before (1990) prices	39.6	58.3	EC (2001:88)
80WW. Same as 80Q and 80II, but vitamin B6 EU	Average annual 1991-94 EU transactions prices in euros vs. before (1990) prices	67	86	EC (2001:88)
80XX Same as 80Q and 80II, but vitamin B6 in EU	Average annual 1991-94 EU transactions prices in euros vs. after (1996-99) prices	91.5	144.7	EC (2001:88)
80YY. Same as 80H, vitamin C but EU	Average annual 1991-95 EU transactions prices in euros vs. before (1989-90) prices	14.8	30.4	EC (2001:89)
80ZZ. Same as 80H, vitamin C but EU	Average annual 1991-95 EU transactions prices in euros vs. after (1997-99) prices	76.0	100	EC (2001:89)
80AAA. . Liquid <b>vitamin A</b> in US, late 1989- Feb. 1999	Benchmark is pre-cartel spot and list US prices	70-75	200	Connor (2001a:320,331)
80BBB. Dry <b>vitamin A</b> in US, , late 1989- Feb. 1999	Benchmark is pre-cartel spot and list US prices	40-45	70-75	Connor (2001a:320,331)
80CCC. <b>Vitamin E</b> , world, , late 1989- Feb. 1999	Benchmark is pre-cartel price	35	--	Connor (2001a:336)
80DDD. Same as 80A (all vitamins), except refers to imports to selected developing countries	Import price decline after the demise of the cartel	35	--	Yu (2003:10)
80EEE. <b>Biotin (vitamin H)</b> , in EU Oct. 1991 to April 1994	Post-cartel decline in prices, conservatively estimated (because quantity increases) from the sales decline from 1994 to 1997-98	31	--	EC (1/10/03:para 18)
80FFF. Same as 80E <b>Vitamin B2</b> in EU from Jan. 1991 to Sept. 1995	Post-cartel decline in prices, conservatively estimated (because quantity increases) from the sales decline from 1994-95 to 1997-98; peak is 1995	21	24	EC (1/10/03:para 18)
80GGG. Same as 80S, DC (human) grade vitamin C, 1/1991 – 12/1995	UK transaction prices 1995 compared to 1997-2000 post	--	51	UKCC (2001:64)

	cartel prices			
80HHH. Same as 80S, regular (feed) grade vitamin C, 1/1991 – 12/1995	UK transaction prices 1995 compared to 1997-2000 post cartel prices	--	62-65	UKCC (2001:10)
80III. Same as 80E, except food-grade vitamin B2, 1/1991 – 12/1995	UK transaction prices 1995 compared to 1997-2000 post cartel prices	--	42-48	UKCC (2001:10)
80JJJ. Same as 80E, except feed-grade vitamin B2, 1/1991 – 12/1995	UK transaction prices 1995 compared to 1997-2000 post cartel prices	--	67-72	UKCC (2001:10)
80KKK. Same as 80M <b>vitamin A</b> , except in Canada for conspiracy period 1/1990 – 2/1999	Econometric model explaining purchase prices of two large buyers from July 1991 to October 2000.	16.6	--	Ross (2005: Table B1)
80LLL. Same as 80H <b>vitamin C</b> , except in Canada for conspiracy period 1/1990 – 12/1995	Econometric model explaining purchase prices of two large buyers from July 1991 to October 2000.	16.2	--	Ross (2005: Table B2)
80MMM. Same as 80C <b>vitamin E</b> , except in Canada for conspiracy period 1/1990 – 2/1999	Econometric model explaining purchase prices of two large buyers from July 1991 to October 2000.	16.2	--	Ross (2005: Table B3)
80NNN. Same as 80A, <b>all bulk vitamins</b> in the U.S. market	A benchmark industry price is developed from the U.S. producer price index for all vitamins products; unadjusted	26.8	--	Breyer (2000: Table 2 )
80OOO. Same as 80A, <b>all bulk vitamins</b> in the U.S. market [Note that Breyer also models a 1988-1989 base period, but the EC decision states that 1988 was a collusive period in the EU, and Connor (2001) shows that the U.S. market was also cartelized in 1988]	A benchmark industry price is developed from the U.S. producer price index yardstick for all vitamins products and a 1989 base period; adjusted for 50% demand and 50% exchange-rate pass-through	21.4	--	Breyer (2000: Table 2 )
80PPP. Same as 80A, <b>all bulk vitamins</b> in the U.S. market	A benchmark industry price is developed from the U.S. producer price index for all vitamins products and a 1989 base period; adjusted for 100% demand and 100% exchange-rate pass-through	15.7	--	Breyer (2000: Table 2 )
80QQQ. Same as 80A, <b>all bulk vitamins</b> in the U.S. market	Same as above plus an adjustment for manufacturing costs changes in Switzerland	15.0	--	Breyer (2000: Table 2 )
80RRR. Same as 80A, <b>all bulk vitamins</b> in the U.S. market	A benchmark industry price is developed from the U.S. producer price index for all vitamins products and a 1999 base period; adjusted for 50% demand and 50% exchange-rate pass-through	15.7	--	Breyer (2000: Table 2 )
80SSS. Same as 80A, <b>all bulk vitamins</b> in the U.S. market [Breyer in Equation 2 states that he has estimate a Lerner index of 13.5%, which here is converted to an overcharge]	Econometric model with demand, costs, and exchange rates explaining monthly transactions selling prices of the six largest sellers from 1980 to 1998.	15.6	--	Breyer (2000: Table 2 )
80TTT. Vitamin <b>premixes</b> in the US market,	Detailed, sophisticated	28.5-	--	Bernheim (2002: 8)

plea period	econometric study using defendant's internal prices	30.2		
80UUU. Same as 80C	Detailed, sophisticated econometric study using defendant's internal prices	37.1-40.5	--	Bernheim (2002: 8)
80VVV. Same as 80BBB	Detailed, sophisticated econometric study using defendant's internal prices	32.3-33.7	--	Bernheim (2002: 8)
80WWW. Same as 80H	Detailed, sophisticated econometric study using defendant's internal prices	23.2-23.8	--	Bernheim (2002: 8)
80XXX. Same as 80F	Detailed, sophisticated econometric study using defendant's internal prices	29.2-34.3	--	Bernheim (2002: 8)
80YYY. Same as 80I	Detailed, sophisticated econometric study using defendant's internal prices	14.5-17.5	--	Bernheim (2002: 8)
80ZZZ. Same as 80E	Detailed, sophisticated econometric study using defendant's internal prices	22.9-23.1	--	Bernheim (2002: 8)
80AAAA. Vitamin <b>biotin (H)</b> in the US market	Detailed, sophisticated econometric study using defendant's internal prices	17.1-19.2	--	Bernheim (2002: 8)
80BBBB. Same as 80D	Detailed, sophisticated econometric study using defendant's internal prices	16.5-18.6	--	Bernheim (2002: 8)
80CCCC. Same as 80J	Detailed, sophisticated econometric study using defendant's internal prices	43-48.9	--	Bernheim (2002: 8)
80DDDD. Same as 80II	Detailed, sophisticated econometric study using defendant's internal prices	21.7-24.9	--	Bernheim (2002: 8)
80EEEE. Same as 80U	Detailed, sophisticated econometric study using defendant's internal prices	19-20	--	Bernheim (2002: 8)
80FFFF. Same as 80JJ	Detailed, sophisticated econometric study using defendant's internal prices	13.5	--	Bernheim (2002: 8)
80GGGG. Same as 80G	Detailed, sophisticated econometric study using defendant's internal prices	22.3	--	Bernheim (2002: 8)
80HHHH. Same as 80K	Detailed, sophisticated econometric study using defendant's internal prices	30.4-31.7	--	Bernheim (2002: 8)
80IIII. Same as 80A	Detailed, sophisticated econometric study using defendant's internal prices	29.2-31.9	--	Bernheim (2002: 8)
81A. <b>Choline chloride (a/k/a vitamin B4)</b> cartel 1989-1998, divided markets between No. American and European manufacturers; convicted by U.S. DOJ and EU and in a US civil jury trial; this is the EU branch	This is an analysis of EU transactions prices, benchmark is pre-cartel EU prices	9	--	Connor (2003: Table A.2), EC (2001:86)
81B. Same as 81A, except No. Am. branch	Benchmark is 1988 price for analysis of U.S. import prices from Canada	39	57	Connor (2003: Table A.3), Con-nor (2001a:330)
81C. Same as 81B	US jury trial; jury chose plaintiffs' expert's econometric	33.6	--	Hausfeld (2003:5)

	model estimate			
81D. Same as 81B	Benchmark is post-cartel price (1999) compared to U.S. import prices from Canada	66	88	Connor (2003: Table A.3), Connor (2001a:330)
81E. Same as 81B	Reading of U.S. court decision	38	--	Appendix Table 4: entry 24 below
81F. Same as 81B	Detailed, sophisticated econometric study using defendant's internal US prices	33.7	--	Bernheim (2002: 8)
82A. <b>Aluminum phosphide</b> international cartel, colluded in US Jan. 1990 to Nov. 1990; some companies convicted by U.S. DOJ at trial	Benchmark is pre-cartel price	47	--	Connor (2003: Table A.3)
82B. Same as 82A	Estimate reported in press, method unknown	48	--	Levenstein and Suslow (2003:49), <i>Kansas City Star</i> 7/14/94
83. <b>BT forest insecticide</b> , bid-rigging of Canadian government tenders 1991-1992, convicted after CBC probe	Statement of CBC officials	65	--	Connor(2003: Table A.3)
84A. About 8 firms colluded by bid rigging on the prices and territories for <b>elevators and escalators</b> , new and service contracts in most parts of the world from May 1992 to late 1997 or early 1998; costs of production were declining during collusion, but benchmarks usually not adjusted; convicted in EU and Korea	Statements of DOJ officials about U.S. prices; DOJ sentencing memo of 10/19/99 shows start price of \$1.00/lb.; peak is Feb. 1997.	24.8	56	Levenstein and Suslow (2003:49), DOJ (10/19/99, 11/30/00)
84B. Same as 84A, except Canadian market	Statements of CBC officials about Canadian prices; CCB press release 7/20/00; government report to OECD;	90	--	OECD (2003: 53), Levenstein and Suslow (2003:49), CBC (7/18/00)
84C. Same as 84A, except EU market	EC report to OECD, EU prices	--	50	OECD (2003: 54)
84D. Same as 84A, except Korean imports	KFTC report to OECD, Korean import prices	25.14	--	OECD (2003: 54)
84E. Same as 84A	U.S. govt. report to OECD about U.S. prices	--	65	OECD (2003: 55)
84F. Same as 84A	Benchmark is before prices in U.S.	51-65	--	Connor (2003: Table A.4)
84G. Same as 84A, except EU market	Benchmark is before prices in EU	50	--	Connor (2003: Table A.4)
84H. Same as 84A, except world market	Benchmark is before world prices	50-58	--	Connor (2003: Table A.4)
84I. Same as 84A ; data are imports to selected developing countries	Import price decline after the demise of the cartel	45	--	Yu (2003:10)
84J. Same as 84A; data are sales in the EU	Prices from June 1992 to Jan. 1998 in the EU in DEM compared to May 1998 price	34.0	55.6	EC(4/16/02)
84K. Same as 84A, except Korean imports	Average annual Korean import prices 1992-1997 compared to before (1988-1990 average)	36.9	57.4	Jeon and Kwangshik (2005: 19)
84L. Same as 84A, except Korean imports	Average annual Korean import prices 1992-1997 compared to after (1999-2001 average)	13.7	30.7	Jeon and Kwangshik (2005: 19)
84M. Same as 84A, except Korean imports	Regression analysis with 14 years' data and 3 independent variables; demand is mis-	42.8	--	Jeon and Kwangshik (2005: 20)

	specified; collusion dummy is positive but of borderline significance ( $t=1.68$ )			
84N. Same as 84A.	Authors suggest that the US and EU fines of \$600 million were an imperfect proxy of the cartel overcharge, divided by US and EU affected sales.	14.5	--	Levenstein and Suslow (2006: 56), Connor (2006b: line 75)
84O. Same as 84A, except Korean imports	Korean FTC analysis of increase in import prices from cartel compared to a yardstick of prices of non-members	36.5	--	OECD (2006:141)
84P. Same as 84A; affected period is 7/1/92 to 6/30/98 (lagged price effects included)	Econometric model presented by plaintiff's expert at jury trial conviction of Mitsubishi; US affected sales from DOJ estimates	33.9	--	Lande and Davis (2006:32-34)
84Q. Same as 84A, except world market	Prices in world 1992-97 compared to average of 1989-1991 price; peak is 1997	29.6	48	Levenstein and Suslow (2003: 826-843)
84R. Same as 84A, except world market	Prices in world 1992-97 compared to July 2000 price; peak is 1997	10.0	23.4	Levenstein and Suslow (2003: 826-843)
84S. Same as 84A.	Prices in U.S. 1992-97 compared to average 1989-1991 price; peak is 1997	39.0	64.2	Levenstein and Suslow (2003: 826-843)
84T. Same as 84A.	Prices in U.S. 1992-97 compared to July 2000 price; peak is 1997	9.0	24.8	Levenstein and Suslow (2003: 826-843)
84U. Same as 84A, except Korean imports	Import prices in Korea 1992-97 compared to pre-cartel prices; peak is 1997; estimate by Korean FTC	25.14	48.8	Levenstein and Suslow (2003: 826-843)
84V. Same as 84A, except Canadian market	Import prices in Canada 1992-97 compared to pre-cartel prices; peak is 1997; estimate by Competition Bureau	--	90	Levenstein and Suslow (2003: 826-843)
85. International cartel in <b>methyl glucamine</b> 1990-1999, convicted by CBC and EC	Benchmark is pre-cartel prices	75	--	Connor (2003: Table A.4)
86. International bid-rigging cartel in <b>shipping of chemicals in parcel tankers</b> 1998-2002, convicted in U.S.	Estimates reported in business press	15	--	Connor (2003: Table A.4), <i>WSJ 2002</i>
87. International <b>sulfur</b> export cartel operated from 1906 to the late 1960s; originally a Sicilian monopoly from 1833 to 1906, when the sulfur Consorzio was established; in 1907 the sole U.S. producer made a bilateral agreement with the Consorzio to divide the world market 67/33%; in 1922, the legal U.S. export cartel Sulexco joined the Consorzio (75/25% shares)				Eckbo (1976:39), Hexner (1946: 272-273); MacKie-Mason and Pindyck (1987:203-210)
87A. Refers to 1934-1939; four U.S. producers controlled 75-80% of world supply and Italy the rest	Eckbo's interpretation of Hexner's case study	50+	--	Eckbo (1976:39), Hexner (1946: 272-273)
87B. Same as 87A	Lerner index derived from an econometric model	81.8	--	Griffin (1989:189-190), Hexner (1946:273)
87C. Cartel 1907-1913; Union Sulfur Co.	Lerner index derived from an	112.8	--	Griffin (1989:189-

agreed to cease U.S. exports to Europe and vice-versa	econometric model			190), Hexner (1946:272)
87D. Cartel during 1922-1932; an agreement between the U.S. Webb-Pomerene Assn. Sulexco of 3 members and the Consorzio to limit exports and set quotas for each party	Lerner index derived from an econometric model	31.6	--	Griffin (1989:189-190), Hexner (1946:272)
87E. Cartel of 1947-1958	Lerner index derived from an econometric model	38.9	--	Griffin (1989:189-190)
87F. Same as 87C, except slightly longer period 1906-1917; two more U.S. suppliers entered by 1919, briefly ending collusion	Average world export prices 1906-1917 compared to 1919-1920 prices; peak is 1908	70	77.3	MacKie-Mason and Pindyck (1987: 203-210)
87G. Same as 87D, except 1922-1940	Average world export prices 1922-1940 compared to 1919-1920 prices; peak is 1932	36.7	93.6	MacKie-Mason and Pindyck (1987: 203-210)
87H. Same as 87D, except 1922-1940	Average world export prices 1922-1940 compared to long-run marginal costs; peak is 1932	201.8	327	MacKie-Mason and Pindyck (1987: 203-210)
87I. Same as 87D	Authors choose 1928 as a representative year and compare elevated discriminatory export prices to the domestic price	203	--	MacKie-Mason and Pindyck (1987: 206-208)
87J. Same as 87E, except 1947-1973; fringe supply grew in Mexico, Canada, and France; in 1968 posted prices replaced by delivered pricing	Average world export prices 1947-1973 compared to 1973 price; peak is 1954	69	131.6	MacKie-Mason and Pindyck (1987: 203-210)
87K. Same as 87D and E; cartel years 1922-1932 and 1947-1962	Econometric model predicts 8.3% decline in export volume during cartel years; price effect predicted from elasticity is statistically significant	6.3	--	Dick (1992:103)
87L. Same as 87D; dates U.S. collusion with the Consorzio from Dec. 1923	Compares prices in 1924-1929 with 11/1923	30	--	Wallace and Edminster (1930:262)
88. International cartel alleged in <b>copper concentrate</b> 2001-2003, probe by U.S. and EU	Press reports, method unknown	25	--	Connor (2003: Table A.4)
89A. EU <b>carbonless paper</b> cartel 1992-1995, fined by EC	From Eur. Commission decision with EU prices	10-24	--	Connor (2003: Table A.5), EC (8/8/2002)
89B. Same as 89A	From final EC decision, EU quarterly 1994-95 price increases of reels, mean across countries; average assumes 1992-93 increases same as 1994-95; peak is 9/95	58	116	EC(4/21/04:82-88)
89C. Same as 89A	From final EC decision, EU quarterly 1994-95 price increases of reels, mean across countries; average assumes 1992-93 increases same as 1994-95; peak is 9/95	39	78	EC(4/21/04:82-88)
89D. Same as 89A	From final EC decision, EU price increases 10/1993-7/1994 of reels, as interpreted by Harrington	29	--	EC(4/21/04:§143), Harrington 2007:84)
90A. Global <b>zinc phosphate</b> cartel 1994-1998, fined by EC	Proxy prices are Special High Grade zinc quarterly prices,	8.4	--	Connor (2003: Table A.5), EC

	traded on a US exchange, 1994Q2 to Dec. 1997; pre-cartel 1992-93 benchmark			12/11/2001), <i>Purchasing Magazine</i>
90B. Same as 90A	Proxy prices are Special High Grade US zinc quarterly prices; post-cartel 1998-99 benchmark	17.8	--	Connor (2003: Table A.5), EC 12/11/2001), <i>Purchasing Magazine</i>
91A. EU <b>steel, seamless tubes</b> cartel 1990-1995, fined by EC	Analysis of "oil country tubes" prices; benchmark is pre-cartel (ca. 1986) corrected for general price inflation	15	--	Connor (2003: Table A.5), EC 12/8/1999), Levenstein (2002)
91B. Same as 91A	Analysis of "oil country tubes" prices; benchmark is post-cartel (ca. 1996) corrected for general price inflation	9	--	Connor (2003: Table A.5)
91C. Same as 91A, except prices of imports to selected developing countries	Import price decline after the demise of the cartel	10	--	Yu (2003:10)
91D. Same as 91A except prices of imports to selected developing countries	Econometric model (predicts monopoly price increase of 16.8%)	13.3	--	Yu (2003:47)
92A. EU <b>flat stainless steel</b> cartel 1993-1996, fined by EC	1994-97 prices of flat stainless steel coils, Type 304, cold rolled from trade magazines; EC statement gives peak price change in March 1995, which permits but-for price during cartel to be inferred	60.0	90+	Connor (2003: Table A.5), EC (1/21/1998)
92B. Same as 92A	Same as 92A above, except used 1997Q1 (post-cartel) price as the benchmark	66.9	100+	Connor (2003: Table A.5), EC (1/21/1998)
92C. Same as 92A	Apparently the authors' interpretation of the EC Decision	--	100	Levenstein and Suslow (2002: 50), EC (1/21/1998)
93A. EU cartel in <b>district insulated heating steel pipes</b> ; whole period of collusion is Nov. 1990-March 1996, but may have begun as early as 1988-89; three episodes: Denmark only 1990-1991, Italy and Germany added 1991-94, and the whole EU 1994-3/96; nine firms fined by EU; three firms paid €21 million in damages in Denmark's first private antitrust suit	There are about ten references to price changes induced by the cartel, but-for prices are from 3/93 and 12/93-2/94 price wars; remaining annual price changes are weighted by annual EU sales to calculate the average; the peak period is 1/95-3/96	17	30	Connor (2003: Table A.5), <i>EC Official Journal</i> (1999/60/EC: 14,47)
93B. Same as 93A	Authors' interpretation of the full EC decision	10-20	--	Levenstein and Suslow (2002: 51), <i>EC Official Journal</i> (1999/60/EC: 14,47)
93C. Same as 93A	Plaintiffs' estimate of single damages (€38.07 million) using 1999 price in Odense after the cartel collapsed as the but-for price; peak is 1992	54-67	69	Møllgaard (2006:7-8)
93D. Same as 93A	Defendants' estimate using the price in 1990 as the but-for price (the Court's expert/referee Møllgaard believes that price is inappropriate because collusion began 2 years earlier); peak is	9-11	12.5	KPMG (2003), PriceWaterhouse-Coopers (2002:16), Møllgaard (2006:8-9)

	1992			
93E. Same as 93A	The High Court of Western Denmark approved a private compensatory suit settlement of €21 million: 57% of plaintiffs' claimed damages and 3.5 times defendants' estimate	34	43	KPMG (2003), PriceWaterhouse-Coopers (2002:16), Møllgaard (2006:8-9), High Court of Western Denmark (2005)
93F. Same as 93A	Defendants' estimate using the cost-based method to develop a but-for price (the Court's expert/referee Møllgaard believes the normal rate of return used was exaggerated because of the defendants' X-inefficiency); peak is 1992	12	15	KPMG (2003), PriceWaterhouse-Coopers (2002:16), Møllgaard (2006:8-9)4
94. A <b>magnesite</b> export cartel was established by Austrian and Czech producers in 1923 (probably ended 1939) as a joint marketing venture; U.S. producers later developed "an understanding" with the cartel to divide the No. Am. and European markets, for which they were prosecuted by the DOJ in 1941	Eckbo's interpretation of the antitrust prosecution	50+	--	Eckbo (1967:40)
95. EU <b>steel beams</b> cartel 1984-1990, EC fines	Benchmark is EU prices in mid 1990 to late 1992 after the cartel members were raided	20-30	--	Connor(2003: Table A.5), EC (2/16/94), <i>The Independent</i> (1/14/93)
96. <b>British sugar refining</b> cartel 1986-1990, fined by EC	From EC decision	50	--	Connor (2003: Table A.2), EC (10/14/1998)
97. <b>Mobile telephone roaming charges</b> in UK and Germany; EC probe underway 2003; dates uncertain (2000-2002?)	Trade journal reports of yardstick fees in other European countries	450	--	Connor(2003: Table A.5)
98. <b>Explosives</b> cartel in U.S. regions 1985-1993; some bid-rigging; U.S. convictions	DOJ indictment for the IL, IN, and KY prosecution, dated 11/5/1997; method unknown	3-4.5	--	Connor (2003: TableA.6), <i>Bus-iness Crimes Bulletin</i> (11/1997)
99. International cartel in <b>thermal fax paper</b> sold in large rolls in U.S. 1990-1992, U.S. convictions	Press stories paraphrasing DOJ and CCB officials	10	--	Connor(2003: Table A.6), Levenstein and Suslow (2002: 51), <i>L.A. Times</i> (7/15/94)
100. International <b>ferrosilicon</b> cartel 1989-1991, convicted in U.S.	From a decision of the US Court of Appeals 2 <sup>nd</sup> Circuit of 11/1999 on the prices set by the cartel in its early months, compared to prices in 1989	5.2-10.3	--	Connor (2003: Table A.6), <i>NY Law J.</i> (11/19/1999), <i>Platt's Metals Week</i> (8/12/2002)
101A. International bid-rigging cartel, <b>USAID wastewater plant construction</b> projects in <b>Egypt</b> , 1988-1996, convicted in U.S. courts; court opinion gives details on profits made on one large bid (47%)	U.S. federal Court of Appeals 11 <sup>th</sup> Circuit (2002) decision gives restitution ordered to be paid to USAID and affected sales; also U.S. govt. report to OECD; consistent with profit rate minus a generous "normal" industry profit rate.	33-38	--	Connor (2003: Table A.6), OECD (2003:56)
101B. Same as 101A	Reading of U.S. court decision	16.4-39.2	--	Appendix Table 4: entry 20 below
101C. Same as 101A	Survey response of US DOJ to	33.3	--	OECD (2003: 56)

	OECD			
102A. Canadian bid-rigging cartel in the <b>compressed industrial gasses</b> industry June 1989 – May 1990; fined by predecessor of the CCB	Statement of the Canada’s Ontario Ministry of Health on the effects of the post-cartel price cut on its gas purchases	21	--	Connor (2003: Table A.6), <i>Globe and Mail</i> 2/8/1992)
102B. Same as 102A	Prices in Ontario compared to US border cities during conspiracy	40	--	Connor (2003: Table A.6), <i>Globe and Mail</i> 2/8/1992)
103. Alleged international <b>sulfuric acid</b> cartel in U.S. and Canada 1988-1998; under DOJ investigation 2003-04	From <i>Chem Market Reporter</i> and other trade magazines, prices for bulk deliveries of pure or standard virgin grade to US, Gulf or Tampa; but-for US price is from year 2000	32-53	--	Connor (2003: Table A.6)
104A. An international price-fixing agreement between a U.S. <b>toy and games</b> manufacturer and two UK retailers to raise prices to manufacturer’s “recommended retail” price; agreement in force from early 1999 to at least May 15,2001 (possibly as late as 9/2001); fined by UK Office of Fair Trade, upheld in April 2005 by the Competition Appeal Tribunal	UK Office of Fair Trade estimate	42	--	Connor (2003: Table A.6)
104B. Same as 104A	The simple arithmetic mean of changes in UK retail prices of five popular toys and games (Monopoly, Dr. X, Action Man, Tweenies Doodles, Knex construction set) from early 1999 to 2001; peak is Knex set	41.8	100.0	UK Office of Fair Trade Decision No. CA98/8/2003 (11/21/2003); <i>Times of London</i> (2/20/03:5)
104C. Same as 104A	Statement by UK OFT of fall in the two retailers’ catalog prices from 2001 to 2003 of the Monopoly game	22.2-25.0	--	UK Office of Fair Trade Decision No. CA98/8/2003 (11/21/2003); AP 4/29/05)
105. International cartel in the markets for <b>generic pharmaceuticals</b> (Warfarin and penicillin) sold by bidding for UK national health service contracts 1996-2000; under UK investigation	UK national health service estimate	163	--	Connor (2003: Table A.6)
106A. International cartel, <b>cement</b> , mostly bid rigging against several German government units 1993-2001; four geographic areas of collusion identified within Germany (E., S., N. and W-Central); fined in 2003 by the Bundeskartellamt (BKA)	Press reports of BKA decision include BKA-estimated overcharges by cartel on a price per ton basis; trade sources on Belgian and EU-wide prices are used for a competitive price	11-23	--	Connor (2003: Table A.6)
106B. Same as above	Based on a real price index of cement in Germany compared to prices before (1978-82); peak is 1999	16.9	28	Lorenz (2006: 6)
106C. Same as above	Based on a real price index of cement in Germany compared to prices after (2004); peak is 1999	16.9	28	Lorenz (2006: 6)
106D. Same as 106A, except refers to East Germany only	Econometric model finds no evidence that pricing conduct changed in 2002	0	0	Blum (2007)
107A. International bid-rigging cartel in large-	Estimate by the Norwegian	37	--	Connor (2003: Table

scale, mostly Norwegian government, <b>construction projects</b> 1994-2000; under investigation	antitrust authority			A.6)
107 B. Same as 107A, except for the years 1993, 1995, 1996, and 1997; the number of bidders varied from N=2 to N=7, and the project sizes from NOK13 to NOK106 million.	The contract values of 5 rigged bids are divided into the side payments made to the losers (a yardstick for cartel profits), where the payments are adjusted by $N/(N-1)$ ; peak is 1997	3.17	5.66	Sunnevåg (2007)
108A. International bid-rigging of Dutch <b>civil construction projects</b> , exposed by parliamentary investigations in 2002-2003; 90% of the bids were for government projects; began before 1986, but illegal only after 1998; believed to have ended 2002; one-third of the bidding rings had 6 or more bidders; of the 1400+ firms, the Netherlands Competition Authority imposed fines of €306 million on 1,300+ firms during 2003-06	Dutch government estimates from internal company documents; given in testimony at Parliamentary hearings; covers 1998-2001 period; method unknown	8.8	--	Connor (2003: Table A.6), Van Bergeijk <i>et al</i> (2006), Tweede Kamer (2002), Van den Heuvel (2005: 133)
108B. Same as 108A, but refers to the construction of government office buildings	A “detailed statistical study by SEO/TNO” (the NL Court of Audit) of construction costs	14	--	Van Bergeijk et al (2006:4), Van den Heuvel (2005: 146)
108C. Same as 108A, but refers to a broad analysis of more than 1300 bids during 1986-1998 and the secret internal cartel records (the “Bos Shadow Accounts”)	All “available national empirical studies”; methods unknown	9-16	--	Van Bergeijk et al (2006:8)
108D. Same as 108A, except refers to tenders that were lost by the Dutch cartels to profitable Belgian construction firms	Compares prices Belgian yardstick to prices of similar projects by Dutch firms	43	--	Van den Heuvel (2005: 136)
108E. Same as 108A.	“Conservative estimate” by economist, method unknown	10-15	--	Schinkel (2009)
109. International cartel in <b>retail gasoline</b> in Italy 1994-2000	Italian competition authority statement; method unknown	3.6	--	Connor (2003: Table A.6),
110. International cartel in <b>retail gasoline</b> on French superhighways 1999-2002; four international petroleum processors were fined €27 million in 2003	Estimate based on yardstick comparisons of prices in nearby, off-highway stations; costs of French superhighway stations actually lower than those in rest of Europe	25-30	--	Conseil Concurrence (2003), Connor (2003: Table A.6),
111. International cartel in <b>retail gasoline</b> in Sweden Nov. 1999-Feb. 2000, convicted by the competition authority and by Stockholm City Court on appeal	Estimate of the Swedish competition authority	8.3	--	Connor (2003: Table A.6), Fallenius (2001: 145, 148)
112A. International cartel in bids for <b>military fuels</b> for the Korean defense procurement agency 1998-2000; heavy fines levied 9/00	Analysis by the Korean FTC presented with its fine decision	17	--	Connor (2003: Table A.6); KFTC (6/7/01)
112B. Same as 112A	Study (probably econometric) by Seoul University found an overcharge of \$99 million	18.1	--	<i>Energy Compass</i> (8/20/04), KFTC (6/7/01)
113. International <b>flat glass</b> cartel operating in U.S. 1991-1995; DOJ investigation, no indictments; civil settlement approved 2/2000 after jury finding of guilt in private treble-damages trial (but before damages phase)	Conclusion of plaintiffs’ expert’s (John Beyer) testimony from an econometric model	30-35	--	Connor (2003: Table A.6)
114. International cartel in <b>ready-mix concrete</b> in Germany 1995-1998; fined by Germany’s	Report of the German government to the OECD;	9	--	OECD (2003:54), Connor (2003: Table

Bundeskartellamt (BKT)	method not revealed			A.6)
115. International cartel in manufacture of <b>ball and roller bearings</b> in France 1993-1997, fined by the French competition council	French Competition Council statement; method not revealed but probably 1992 price comparison	9.4	16.4	Connor (2003: Table A.6), Conseil Concurrence (9/23/02)
116A. International bid rigging by ABB and Siemens in the Norwegian <b>electrical (hydro-power) equipment</b> industry 1970?-1997; kept market shares constant at 67% and 33% for decades; fined by Norway	Norwegian competition authority report to OECD; method not revealed	9	--	OECD (2003:55)
116B. Same as 116A	Analysis by the chief economist of the Norwegian Competition Authority that shows price effects of 7 rigged contracts; method unknown	26.9	39	Sølgard (2007:16)
117. International cartel that fixed the fees for Italian <b>cell (mobile) telephone services</b> 1998-1999, fined by Italian antitrust authority (AGCM)	Estimate of the Italian antitrust Authority AGCM; method not revealed	11	--	Connor (2003: Table A.6),
118. Bid rigging against Italy's national health service for <b>pharmaceuticals treating respiratory illnesses</b> 1995-1997, fined by AGCM	Statement of the AGCM; method not revealed	50	--	Connor (2003: Table A.6),
119. Bid rigging against Italy's national health service for <b>pharmaceuticals treating high cholesterol</b> 1995-1997, fined by AGCM	Statement of the AGCM; method not revealed	50	--	Connor (2003: Table A.6),
120. <b>Frozen foods</b> cartel in Tasmania, Australia, "late 1990s" (ca. 1996-99), prosecuted and fined by Australian Competition and Consumer Commission	Report of the government of Australia to the OECD	10-12	--	OECD (2003:53)
121. Installation of <b>fire protection devices</b> in Australia; ca. 1996-99; fined by Australian CCC	Report of the government of Australia to the OECD	5-15	--	OECD (2003:53)
122A. Bid-rigging by 260 <b>electric wiring contractors and electricians</b> in Denmark in late 1990s (ca. 1996-2001); convicted and fined by Danish courts	Report of the Government of Denmark to the OECD; method not revealed	20-30	--	OECD (2003:54), Gommesen (2003)
122B. Same as 122A	Analyses of "long run prices" by the Danish Competition Authority (DCA) using several yardsticks	12	--	OECD (2006:120)
122C. Same as 122A	A DCA survey of several property-management companies of the post 2001 change in prices	11.1	--	OECD (2006:120)
123. Bid rigging of public tenders for <b>road markings</b> in Germany in 1990s (ca. 1990-99); fined by BKA	Report of the government of Germany to the OECD; from a decision; method not revealed	13+	--	OECD (2003:54)
124A. <b>Cables, high voltage electricity</b> in Germany began in 1902; legal until 1958; formally ended when fined in 1997, but may have broken down in 1992-93 as a result of German unification; bid rigging conduct; national cartel protected from imports by a separate intl. cartel; 34 members in 1968, declined to 24 in 1990; CR4=84%; heavily fined by BKA in 1997	Report of the German government to the OECD; refers to 1958-1997 period when price-fixing was illegal in Germany; method not revealed	--	50	OECD (2003:54), Normann and Tan (2005)

124B. Same as 124A; cartel registered but ignored by BKA until fined in 1972 and 1974; from 1974 to 1985, cartel granted a rationalization exemption but secretly fixed prices contrary to rules through a trust and a trade association; ended 1997	Regression analysis of annual data for 1958-1990; profit increase during 11-year period cartel was exempted compared to non-exempt period	16.4	--	Normann and Tan (2005: 16-20)
125. <b>Hotel association</b> in Spain; ended late 1990s; fined by Spain's competition authority	Report of the government of Spain to the OECD; method not revealed	3	--	OECD (2003:55)
126. <b>Sugar</b> in Spain; ended late 1990s; fined by Spain's competition authority	Report of the government of Spain to the OECD; method not revealed	3	--	OECD (2003:55)
127A. The U.S. Railroad Express Cartel fixed prices for <b>long-distance shipments of packages by rail or ship</b> from 1851 to 1913, when its members came under the authority of the Interstate Commerce Commission; in its 62 years; only one price war, in response to a failed attempt at large-scale entry; only two brief episodes of dissent; annual profits in late 19 <sup>th</sup> cent. averaged 40% on invested capital despite very large side payments to shipping firms (which provided no free services)	Rates are taken from several archives of the internal business records of the five cartel members; mark-ups are calculated from the inter-member charges (costs) for transshipments between exclusive territories in 1885-1900	150-233	--	Grossman (1996:227)
127B. Same as above	Change in rates in overlapping cities during the only recorded price war in 1886 -1888	50-72	--	Grossman (1996:229)
128. To stem to steep decline in <b>tea</b> prices since 1927, a voluntary agreement in 1930 by four regional producer associations in Asia representing hundreds of tea plantations led to an agreement on significant output reductions in 1931-1932; followed by a mandatory British Empire cartel in 1933	Prices in 1931-1932 (the first since before 1927) compared to prices in late 1920s in the London market (handled 56% of world market) for four teas, weighted by the four regions' average quantities sold in 1931 and 1932.	29.0	--	Gupta (2001a: 146)
129A. The first episode of the global cartel in <b>heavy electrical power equipment</b> began in 1892 and ended 1914; the second lasted from 1919 to 1939; and the third called the International Electric Association operated from London from 1945 to at least the early 1980s; members rigged bids to private and public utilities, most in low-income countries; controlled 72-86% of world trade in heavy electrical power equipment in 1965-67; 1945 DOJ conviction of 2 <sup>nd</sup> episode and 1947 FTC consent decree covered only IEA trade with U.S.; U.S. Congress hearings and Brazilian investigation in early 1980s, but no legal actions after 1947; the IEA as a formal organization was still in existence in 1999 but effectiveness ended earlier (ca. 1990-95)	No price data for first two episodes.			Mirow and Maurer (1982: 276-282), Epstein (1971), Epstein and Newfarmer (1980: 52), Jenny (2003); Hexner (1946: 360-362)
129A . Refers to 3 <sup>rd</sup> episode	Detailed internal records of IEA's bids for large power transformers May 1965-Dec. 1967 show differences in winning prices between rigged and unrigged tenders (latter is	11.9	69	Mirow and Maurer (1982: 276-282), Epstein (1971), Epstein and Newfarmer (1980: 52)

	the yardstick); average is for a large sample of industrialized countries; peak is for bids with single bidders			
129B. Same as 129A above	Winning bid prices in 1970s when by agreement only one IEA member bid and no outsiders bid vs. bids with outsiders	50	--	U.S. Congress (1980:125)
129C. Same as 129A	Same as 129A, but refers to mark-ups for less developed countries	18.7	69	Epstein and Newfarmer (1980: 52)
130A. International <b>uranium metal</b> cartel of world's major producers in France, Canada, Australia, UK, and South Africa was founded in 1972 and operated effectively from mid 1974 to Dec. 1975; a private U.S. suit filed against Gulf Oil (parent of Canadian member) resulted in payout of about \$1 billion; criminal DOJ misdemeanor case ended with Gulf pleading <i>nolo contendere</i> and paying \$40,000 fine, low because of Canadian government objections.	U.S. prices in Dec. 1974 to Dec. 1975 compared to early 1974; peak is Dec. 1975; world prices followed similar trend	244	471	Mirow and Maurer (1982: 95-118), U.S. Congress (1977)
130B. Same as 130A above; book by Canadian journalist identifies the effective cartel period as mid 1972 to Feb. or Mar. 1974, after which market forces influenced primary control; by July 1974, world prices were 25% higher than the cartel's list price	Price data not very precise; appears that pre-cartel price outside U.S. was about \$4.50/lb.; cartel raised prices by \$2 to end of 1973 and by another \$1.34 in late Jan. 1974	44	74	Gray (1982: 147,151,164)
130C. Same as 130A	Lerner index predicted from econometric model	100.0	--	Griffin (1989:189-190)
130D. Same as 130A, except that price data from the US civil trial show that the cartel floor prices in 10/1973 and 1/1974 led the rise in spot US prices; author concludes that cartel had only short-run price effects.	Average US Nuesco spot prices in 10/73 to 12/74 compared to spot prices in 6/73 to 9/73 (\$6.25)	62.7	140	LeCraw (1977: 78)
130E. Same as 130A	Same as above except that the base price is total economic costs, including profit and a risk premium (also \$6.25)	67.2	140	LeCraw (1977: 78 and 82)
130F. Same as 130A	Author concludes that it was "unlikely" that cartel affected prices	0	0	Joskow (1976)
130G. Same as 130A	Reading of U.S. court decision	--	567	Appendix Table 4: entry 19 below
130H. Same as 130A, except authors suggest that cartel exhibited supra-normal prices from mid 1974 to about the end of 1989; prices from the 1969-1986 Nuexco Exchange spliced to 1987-2005 Ux U308 prices; the average annual price 1975-88 was about \$57 (in \$2005). Prices were declining from about \$27 in 1969 to \$22 in 1974 and continued to decline fro \$19 in Dec. 1989 to \$12 to \$10 in the mid 1990s.	Authors calculate the real \$2005 prices and identify \$27 as the approximate "before" price; price peaked at \$110 in early 1977	111	307	Estimated by author from Davis and Garces (2009: Fig. 2 of chapter on damages)
130I. Same as 130H.	Authors calculate the real \$2005 prices and identify \$19 as the approximate "after" price; price peaked at \$110 in	200	479	Estimated by author from Davis and Garces (2009: Fig. 2 of chapter on

	early 1977			damages)
131A. <b>Quinine</b> Convention, intl. cartel of four manufacturers in NL, DE, UK, FR; agreements on reducing export sales, stocks, and member quotas from 1959-1966; 1968 criminal indictments by U.S. DOJ resulted in <i>nolo</i> pleas and substantial fines; EC fined 6 firms \$470,000 in 1970	World prices in early 1964 to 1966 compared to prices in early 1960s; some of the increase was due to a surge in demand by the US military, but this is not corrected for	--	400	Mirow and Maurer (1982: 130), U.S. Congress (1966-67)
131B. Same as 131A	Price offered to League of Nations for relief programs compared to cartel price	77.5	--	Staley (1937:289-290)
132. <b>Red phosphorous</b> cartel 1959-“early 1960s” (ca. 1963); three companies from UK, NL, and DE; price fixing and territorial division everywhere except Asia	Prices before cartel compared to cartel price in early 1960s	43	--	Mirow and Maurer (1982: 134-135)
133. The Southern Railway & Steamship Association was the second successful and stable U.S. cartel 1875-1887; all <b>long distance freight and passenger transport</b> among companies operating south of the Potomac and Ohio rivers and east of the Mississippi; historical study based on its internal records	An estimate made by the association in prior to its first month of operation of revenue losses due to discounting from regular rates	42	--	Hudson (1890: 71)
134A. The Western Ontario <b>petroleum lamp oil</b> refiners’ cartels operated 1870 to 5/1880; first episode was 1870-73	Econometric cartel model with monthly wholesale lamp oil prices Jan. 1870 to May 1880, with dummy variable for known collusive periods; difference between predicted competitive and collusive prices	31	55	Grant and Thille (2001: Figure 2)
134B. Same as 134A above, but for 2 <sup>nd</sup> episode 1874 to mid 1877	Same as above	68	84	Grant and Thille (2001: Figure 2)
134C. Same as 134A above, except for 3 <sup>rd</sup> episode mid 1877 to May 1880	Same as above	0	--	Grant and Thille (2001: Figure 2)
135A. The international 1926-1939 <b>phosphate rock exports</b> cartel began with the cooperation of the French and German national cartels (under government pressure); in 1933 the Phosphate Export Assn. (a U.S. Webb-Pomerene assn.) joined the European cartel, for which it was indicted by the DOJ in 1939; other phosphate cartels from North Africa, Egypt, and Curacao joined in 1933-1934	Eckbo’s interpretation of the abuse of dominant position of the French and German cartels in place of “unpublished” export prices; such prices are shown in Hexner (1946:265)	50+	--	Eckbo (1967:39), Hexner (1948: 264-266)
135B. U.S. national Webb-Pomerene phosphate export association, active 50 years, 1919-49 and second episode 1961-67; separate cartel from 135A for most of its existence	Econometric model with insignificant quantity effects; price effect almost significant	9.2	--	Dick (1992:103)
135C. Same as 135A, but Griffin studies only 1933-1937	Lerner index from econometric model	72.4	--	Griffin (1989:189)
136A. “ <b>Artificial silk</b> ” ( <b>rayon</b> ) cartel re-formed in Germany, France, and Italy in late 1920s; unusual cartel because a technologically dynamic industry with rapid output and productivity increases	Author asserts that neither national nor international industry groups show any signs of market power in 1929-mid 1930; method unknown	0	--	Benni <i>et al.</i> (1930)
136B. Examines two earlier episodes of 136A, 1906-Oct. 1910 and 1911-14; members from	The Feb. 1913-1914 agreement allowed members to buy	5	--	Coleman (1969:73)

DE, FR, IT, CH, BL, UK, and (after 1911) US; assigned export quotas and exclusive home-country monopolies	additional export quotas for a “commission”; a yardstick for monopoly profits			
137. An international <b>linoleum</b> cartel was formed Dec. 1911 by almost all the factories of Europe; invented in 1860, but production technology standardized in early 1900s; cartel enforced uniform quality standards and grades; cartel objective was constant prices, not higher ones; ended 1939 [UK branch #180 below ended operations 1960]	European prices from League of Nations show nearly flat prices 1924-1930, despite large increases in industry labor costs and two biggest material inputs (linseed oil and cork)	0	--	Benni <i>et al.</i> (1930:64)
138. <b>Mechanical sulphite paper pulp</b> cartel formed in 1930 after European prices fell 66% by leading companies from Austria, Germany and Scandinavia; probably ended 1939	Prices of sulfite pulp fell 22-26% 1930-35; but prices of yardstick (noncartelized sulphate pulp) fell more	2.8-10.0	--	Oualid (1938:26)
139. Bid-rigging on sales to U.S. government purchases of <b>titanium metal</b> 1970-1976; found guilty at trial in <i>U.S. v. RMI Co.</i> (1978)	Prediction from a time-series econometric model used for expert economic testimony	1.1	--	Duggan and Narasimhanm (1981:243)
140. The Wisconsin Alumni Research Foundation held the Steenbock patent to <b>Vitamin D</b> and licensed its manufacture; author, the U.S. AAG for antitrust alleges that its agreements with various buyers set prices in 1930s until the weakness of the patent became apparent in 1938-40	Compares agreement with du Pont for use in bread products with prices charged to Gen. Mills (1940) and Gen. Baking (1938)	48-233	--	Berge (1944:104-105)
141. A conspiracy (11/1900-7/1904) among three U.S. industry associations (for manufacturers, wholesalers, and retailers) to raise the retail prices of <b>pharmaceuticals</b> to a pharmacist by “blacklisting” him; from a U.S. jury trial decision in <i>Loder v. Jayne</i> (1906)	The Court decided the combined price effects of the three restraints on trade using the change in gross profit on sales from before the conspiracy to during	8.0	--	Timberlake (1961:258)
142A. U.S. <b>corrugated cartons (containers)</b> cartel 1960-1976; guilty finding confirmed by Supreme Court; private federal class-action suit ( <i>In re Corrugated Container Antitrust Litigation</i> ) against three last defendants, of which 2 settled before the trial’s conclusion	Jury decision after hearing class plaintiffs’ expert testify to a 8% to 19% overcharge and defense expert testify to a less than 1% figure	5	--	Finkelstein and Levenbach (1983:148)
142B. Same as 142A	Plaintiffs’ econometric model prediction; authors judge that it has some major econometric estimation problems	7.8-19.1	--	Finkelstein and Levenbach (1983:148)
142C. Same as 142A	Plaintiffs’ model is fitted to same data, but some if not all estimation problems are corrected	4.0-4.3	--	Finkelstein and Levenbach (1983:148)
142D. Second treble damages suit by opt-outs from federal class (see 142B above)	Revised econometric model by plaintiffs’ expert, which authors judge to be more problematic than the original	26	--	Finkelstein and Levenbach (1983:149)
142E. Same as 142D above	Testimony by Defendants’ expert finds numerous problems with plaintiffs’ model	0	--	Finkelstein and Levenbach (1983:149)
142F. Same as 142D above	Jury’s decision	0	--	Finkelstein and Levenbach (1983:149)
142G. Same as 142A	Plaintiffs’ expert’s econometric model prediction	7.8-26.0	--	Cohen and Scheffman

				(1989:345)
142H. Same as 142A	Defendants' expert's econometric model prediction	0	--	Fisher (1980:729)
143A. In <i>New Mexico v. American Pipe and Construction</i> bid-rigging on <b>concrete pipes</b> from Feb. 1968 to Dec. 1973; one of several similar cases	Plaintiff's expert predicted the but-for price from an econometric model using dummy variable for a brief competitive period; model judged sound by experts	15.5	--	Finkelstein and Levenbach (1983:150), Parker (1977)
143B. Same as 143A	Defendant's expert presented a rival econometric prediction using the "residuals" approach, which is inappropriate	0	--	Finkelstein and Levenbach (1983:149, 164)
144. In <i>In re Chicken Antitrust Litigation</i> (1980) only the plaintiffs presented econometric evidence on an alleged association program to raise prices Jan. 1971-March 1973; the DOJ imposed injunctive relief	Plaintiff's experts predicted a negative overcharge, which is judged to have serious autocorrelation problems; reruns indicate ineffective collusion	-5	--	Finkelstein and Levenbach (1983:165)
145A. In <i>In re Plywood Antitrust Litigation</i> , three manufactures were found guilty of price fixing (using basing-point pricing system) of <b>plywood in Southern US</b> from Feb. 1968-Dec. 1973 by a jury; jury ignored the statistical evidence and figured damages from the "phantom freight" charges and excess weight allowances.	Defendants' econometric model predicted no overcharge because of high demand during conspiracy, but later econometric experts judge the R&S model to be highly flawed	0	--	Finkelstein and Levenbach (1983:154-158), Rubinfeld and Steiner (1983)
145B. Same as 145A, but this author believes the <b>Southern plywood</b> cartel lasted from 1964 to Dec. 1973; system used Douglas fir plywood prices in Portland, OR plus Denver-to-East RR delivery prices; cartel had 4 members 1964 and 24 by 1974, when CR4 slipped to 55%	The average discount from the official basing price was 5% 1967-1973; post cartel discounts are the but-for prices; best measure is Feb. 1977 when all sellers shifted to F.o.b. plant pricing	19	--	Loescher (1980:16)
146A. International <b>tin</b> cartel Sept. 1929-March 1931; initially an entirely voluntary agreement of British, Dutch and Bolivian producers to reduce production by major mines; when cuts became too large, British and Dutch governments stepped in to enforce them and buy stocks; in 1931 an intergovernmental commodity agreement was signed that strongly increased prices soon thereafter	Lerner index predicted from an econometric model	14.9	--	Griffin (1989:189-190), Hexner (1946:240-242)
146B. Same as 146A; Plummer quotes only falling prices	London exchange prices from before cartel to 1930-early 1932	-10	--	Plummer (1934:92-94)
146C. Same as 146A	Judged to be "ineffective"	0	--	Elliott <i>et al.</i> (1937)
146D. Same as 146A	Price rise from fall 1932 to spring 1933 due to cartel's cut in export volume; after spring 1933 demand increased prices	27-36	--	Staley (1937: 308)
146E. International cartel of 1921-1924	Econometric model predicts Lerner Index	22.0	--	Griffin (1989:189-190)
146F. International cartel of 1956-1981; possibly government sponsored	Econometric model predicts Lerner Index	47.1	--	Griffin (1989:189-190)
146G. Same as 146E	Mean annual deflated wholesale price for 1921-25, relative to 1920 price; peak	37.3	83	Suslow (2005:734)

	year 1925			
146H. Same as 146E	Mean annual deflated wholesale price for 1921-25, relative to 1926-27 price; peak year 1925	0	0	Suslow (2005:734)
146I. Same as 146A, except 1931-32	Mean annual deflated wholesale price for 1931-32, relative to 1930 price; peak year 1931-31	0	0	Suslow (2005:734)
147A. International <b>coke</b> cartel April 1937-Sept. 1939; export quotas for all major European producers administered by a joint venture in Brussels	Lerner index from econometric model	85.2	--	Griffin (1989:189-190), Hexner (1946:275-276)
147B. Same as 147A, except for year 1902	Compares 1902 domestic German price with price of exports to Austria (a yardstick)	53	--	Hirst (1905:115)
148A. The formal U.S. <b>Whiskey Trust</b> was formed in May or June 1887 to make distilled alcohol for cheap whiskeys; preceded by numerous short-lived pools that were briefly effective in raising prices during 1882-86; first successful episode ended late 1888; data from hearings of US (Congressional) Industrial Commission.	When pools were operating, gross margin increased about \$0.25/bu. of corn; avg. prices net of taxes and discount were \$0.85-\$1.12 for whiskey made from 1 bu.	22-29	--	Jenks (1900:146-150), Jenks and Clark (1929: 99-107)
148B. Same as 148A above, except 2 <sup>nd</sup> episode 1890-94	First effective period for formal trust is 1890-1894; comparison of gross margin increase with wholesale prices	12-18	--	Jenks (1900:146-150)
148C. Same as 148A above, except 3 <sup>rd</sup> episode 1896-99	Effective period is 1896-99; uses gross margin approach	0-9	--	Jenks (1900:146-150)
148D. Same as 148A above, except 4 <sup>th</sup> episode 1906-09	Gross margins in 1906-09 compared to competitive 1903-06 period, taking into account upgrading of product quality	7-12	--	Jenks and Clark (1929:100-105)
148E. Studies 16 years of at least 4 episodes: the summer quarters of 1882 to 1898 (except for 1895); thus same as 148A to 148C plus 1882-86; peak cartel supply control of US market was 40% to 48% in 1887-1892; slipped to 29% by 1895.	The authors fit four different demand functions to a complex econometric system of equations; the model predicts four elasticity-adjusted Lerner indexes; average overcharges are 83% to 94% below the monopoly overcharge; two peak periods, 4 quarters in late 1888 and 1824-93, are 58% to 84% below monopoly overcharge	8.2-9.9	18.3	Clay and Troesken (2003: 162-163)
148F. Same as 148E, but adds 22 new quarters of data from April 1888 to March 1895, a total of 38 quarters	Same as above, but for more observations	9.4-11.5	18.3	Clay and Troesken (2003: 162-163)
149A. The U.S. <b>Wire Nails</b> Pool lasted for 19 months in May 1895-Nov.1896; very complex organization; made side agreement with similar cartels in Canada and Europe; also co-opted U.S. cut-nail makers; collapsed when new factories came on stream; ineffective after 1901	Comparison of prices in month before cartel with average prices in 18-month period; peak is last 6 months	97	117	Jenks (1900:62), Jenks and Clark (1929)
149B. Same as 149A	Method not explained, but probably constant-margin	113	--	Jones (1921:10)

149C. In January 1899, a 2nd episode began with the formation of the Am. Steel and Wire Co. trust, which controlled 65 to 95% of the US market. The gross margin increased from about \$0.70 in 1898 to \$1.00 in 1899; peak was \$1.40 in Oct. 1899 ended early 1900.	The price increased from about \$0.80 to \$0.90 in 1898 to \$1.50 to \$2.95 in 1899; peak was \$2.95 in Oct. 1899.	67-269	228-269	Jones (1900:165-170 and chart)
149D. Same as 149A, except that 3rd episode began when, in response to rapidly falling prices in early 1900 (about 25%), the Wire Trust closed several of its mills in April 1900; producers outside the Trust followed with closures of their own; gross margins rose well above 1897-98 levels and remained high until end of 1901.	Prices of wire nails stabilized in 4/1900, declining slowly until the end of 1901; competitive bench mark is 1897-98 prices; peak is 1/1991-9/1901.	73	77	Jones and Clark (1929: 121-122 and chart)
149E. Same as 149C.	Chicago-NY price per keg in 1888 \$1.45 compared to 1899-1900 average; peak is 12/1899-3/1900	85	143	U.S. Industrial Commission (1901: 561)
149F. Same as 149A.	Author gives monthly prices of 8 d. nails, the modal type; benchmark is prices for 4 months before May 1895; peak is May-Nov. 1896	75	113	Edgerton (1897:260)
149G. Same as 149A.	Same as above, but corrects for increase in major input price, No. 11 steel wire	50	88	Edgerton (1897:260)
149H. Same as 149A.	Benchmark is prices 4 months after cartel dissolved	69	106	Edgerton (1897:260)
149I. Same as 149A.	Same as above, but corrects for increase in major input price, No. 11 steel wire	44	81	Edgerton (1897:260)
150. U.S. <b>steel rails</b> pool; analysts identify four episodes; Jones gives dates of the 1 <sup>st</sup> episode as 1887-93 and the 2 <sup>nd</sup> as 1894-98; Seager and Gulick describe a 3rd episode from 1897 to 1904; the association of 15 members controlled 90%+ of the U.S. market; set total tonnage and quantity shares to achieve an elevated price; later sued by US DOJ. The 4 <sup>th</sup> episode led by U.S. Steel was 2/1901 to 3/1916.				Jones (1921: 9-10), Seager and Gulick (1929:90-91)
150A. The latter part of the 1st episode seems to have started Feb. 1890 and ended Dec. 1894; prices absolutely flat during three sub-periods; possible price war Jan.- June 1895.	Report prepared by the Industrial Commission that used the constant-margin (cost-based) approach; avg. price \$28.07; war price \$22; peak in 1891-92	27.6	36.4	U.S. Industrial Commission (1901: 766-770)
150B. Same as A, except 1894-98.	Jones refers to a U.S. DOJ court brief that states that after 1897 prices fell 41% after the 2 <sup>nd</sup> episode of 1894-98 ended	69	--	Jones (1921: 9-10)
150C. Same as B: part of the 2nd episode, July 1895 to Dec. 1896; prices absolutely flat during all but one month; possible price war Jan.- June 1895.	Report prepared by the Industrial Commission used the constant-margin (cost-based) approach; avg. price \$27.83; war price of \$17 in late 1898; peak in Aug. 1895- Dec. 1896	63.7	64.7	U.S. Industrial Commission (1901: 766-770)
150D. Part of the 3rd episode, May 1900 to	Report prepared by the	69.4	106	U.S. Industrial

April 1901	Industrial Commission that used the constant-margin (cost-based) approach; avg. price \$28.80; cartel war price \$17; peak in May 1900 to Aug. 1900			Commission (1901: 766-770)
150E. Same as 150B.	Jones refers to a U.S. DOJ court brief that states that after 1897 prices fell 41% after the 2 <sup>nd</sup> episode of 1895-96	69	--	Jones (1921: 9-10), Seager and Gulick (1929:90-91)
150F. A 4 <sup>th</sup> episode began in Feb. 1901 with the formation of the U.S. Steel Corp. and lasted until at least 3/1916, after which the effects of WWI begin to overwhelm the cartel led by U.S. Steel.	In late 1899 and early 1900, price was \$26/ton; despite general inflation and considerable shifts in demand and pig iron costs, from Feb. 1901 until Mar. 1916 price was an unwavering \$28.	7.7	7.7	Jones and Clark (1929: 122- 128 and chart)
150G. Same as 150F.	Testimony before the Industrial Commission is that rails were being exported (with normal profits) at \$20-21/ton vs. \$28 in US	33-40	--	U.S. Industrial Commission (1901: 555)
151. U.S. cartel in <b>steel tubes</b> from June 1899 to 1900	Prices in 1899 compared with before cartel	227	--	Jones (1921:264)
152. U.S. Webb-Pomerene export association for <b>carbon black</b> , active for 48+ years 1923-51 and 1958-70+	Econometric model with dummy variable for the cartel's active years; quantities exported fell 19.8%	7	--	Dick (1992a:103)
153. Effects of concentration (numbers of firms) on the spreads of U.S. <b>tax-exempt bond underwriting auctions</b> ; a study of 9420 bond issues during 1959-1967; suggests bid-rigging behavior by bond buyers against the Treasury/seller	Comparison of estimated regression coefficients of winning bids in issues with 9 or more bidders with price spread when only two bidders were in the auction	--	2.35	Brannman (1989:73)
154. Same as 153 above for 2221 <b>auctions for government offshore oil leases</b> from the U.S. Department of the Interior 1954-1975; suggests bid-rigging behavior by buyers against seller	Same method as 153 above except competitive number of bidders in 10 or more	--	2.5	Brannman (1989:73)
155A. The <b>Rhenish-Westphalian (Ruhr) Coal</b> cartel (a/k/a RKWS) was formed in 1893, a mix of private and state-owned mines; effective in raising prices until state price controls were imposed in March 1919; the Deutsche Mark experienced little or no inflation through at least 1909; this is the cautious Liefmann's only price estimate in a long book on cartels [Stockder splits 1893-1914 into 4 episodes]	The author states that Essen Coal Exchange prices were representative of the pre-cartel period 1891-93 (i.e., a competitive yardstick); average 1894-1913 prices and peak 1907-09 prices compared to the yardstick	16.5	34.6	Liefmann (1932:52)
155B. Same as 155A	Compares 1902 domestic German price with the yardstick price of exports to Belgium and Netherlands	5.8	--	Hirst (1905:115)
155C. Same as 155A	Compares coal exchange prices during the 1901-04 depression with the 1891-93 base period	14	--	Liefmann (1932:52)
155D. Part of A. Stockder distinguishes several possible episodes of the Ruhr coal cartel; during first of 4 episodes (1893-1898) there	Stockder shows annual 1893-1898 contract prices; but-for price is 1893 price of 7 marks	12.0	20.0	Stockder (1932: 121)

was significant undercutting of cartel annual supply contract prices by steel producers that were integrated backward into coal mining	per tonne			
155E. Same as 155D	Stockder shows annual 1893-1898 contract prices; but-for price is 1922 post-cartel price of 7 marks per tonne	12.0	20.0	Stockder (1932: 121)
155F. Part of A. Second episode: in 1898 the cartel offered attractive incentives to the integrated steel-coal producers to observe the cartel's prices; other minor revisions in the cartel agreement occurred in 1903, 1909; ended 1914	1899-1914 annual contract prices are compared to 1893 pre-cartel price	47.5	71.4	Stockder (1932: 121)
155G. Same as 155F	1899-1914 annual contract prices are compared to 1922 post-cartel price	47.5	71.4	Stockder (1932: 121)
155H. In the 3 <sup>rd</sup> episode, 1915-1921, the cartel was effectively nationalized by the German Government (no longer private)	No information on price effects	--	--	Stockder (1932)
155I. After a 1922 price war, a new international-export agreement was created (4 <sup>th</sup> episode) in 1924 that lasted to about 1939; some historians argue that monitoring and sanction powers were absent; others believe that the common sales agency made the cartel quite disciplined about export sales and prices	Judged "ineffective" by Stockder, "effective" by Heaulme, but latter has no quantitative estimate	0	0	Stockder (1932), Heaulme (1948)
155J. Same as A.	Econometric study of stock prices of all listed coal mines in the cartel and their financial performance; concludes that the cartel reduced price variation and raised prices "above the competitive level."	1	>0	Luebbers (2009)
156. The second phase of a U.S. <b>plumbing fixtures</b> conspiracy involved 15 companies from Sept. 1962 (for cast-iron bath tubs) or Oct. 1962 (porcelain toilets) to 1968; most companies pleaded guilty and were fined, but three companies and three executive were found guilty at trial in late 1969.	Authors were guided by direct testimonial evidence accepted by the jury in the trial; these price changes apparently were only the first increases implemented by the cartel in late 1962	6-7	--	Demaree (1969:99), Davidow (1972:374)
157. A regression model fitted to 1950-1985 data on 12 legal Japanese export cartels; only the one for <b>paints</b> has results consistent with price mark-ups	Coefficient on export price	56.9	--	Dick (1992b:287)
158A. The U.S. <b>gunpowder trust</b> was formed in 1872 as a price-setting trade association; became a formal cartel of 7 producers in 1886-1902; later grew to 12 members; assigned quotas in 7 regions, had a penalty system and a trigger mechanism; after 1895 the agreement was kept secret and code names were used to prevent discovery; morphed into the du Pont monopoly by 1907; found guilty of price fixing and monopolization in 1912	In 1882-1884, members of the cartel that were over quota were required to compensate the others by selling powder at 16-25% below the fixed price	16-25	--	Curtis (1931:28), Stevens (1912a: 452 )
158B. During 1896-1902, three new gunpowder firms briefly entered the Midwestern market; the strongest of the entrants was Indiana	Difference between price in Indiana Powder sales region (the yardstick) and prices	29	--	Stevens (1912a:459)

Powder; the trust built a new plant nearby and cut prices in its sales region	charges by trust in surrounding regions			
159A. The Swiss-German (international) <b>synthetic dyestuffs</b> cartel had dominated the <b>Japanese</b> market before WWI [this early date is inconsistent with other authors]. A domestic Japanese industry developed during the War to serve the rapidly developing textile industry; tariffs were imposed to protect Japanese dyestuffs in 1924 until the national industry negotiated a division of dye types between exclusively domestic lines and I.G. Farben import lines; made effective Aug. 1928; tariffs were eliminated; ended formally in 1945 but effectively in late 1939	Comparison of Japanese prices of imported dyes (net of tariffs) in early 1928 with immediate price increase after bilateral agreement by Farben in Oct. 1928	5	--	Kudo (1994:216)
159B. Legal <b>Swiss synthetic dyestuffs</b> cartel was formed by three companies in 9/1918 to combat expected decline in export demand as major importing countries increase tariffs; starting in late 1918, quantity exported fell by 73% in 1924-25 compared to 1913; prices highest in 1918-1920, but this was an abnormal period; national cartels ended 1929 when Swiss, French, and German sellers joined together.	Real average Swiss export prices of dyestuffs in 1921-1925 are compared to prices in 1910-13; peak is 1922	18.3	48.0	Schmitt and Weder (1998: Table 2)
159C. A German <b>dyestuffs</b> national cartel was formed under I. G. Farben in 1925; joined with the French cartel in 1927 to form 1 <sup>st</sup> <b>international</b> cartel that allocated world exports; 3 more episodes followed, when the Swiss joined in 1929, UK's ICI in 1932, and Japan's NSK in 1935; by 1938, 80-90% of world exports under its control; ended Sept. 1939	During 1932-1939, members could sell export quotas to each other for cash equal to 15-25% of the price; this is a monopoly profit yardstick	15-25	--	Haber (1971: 275-76), Schroeter (1990:139)
160. Beginning as early as 1829, railroads began vertically integrating by buying <b>anthracite coal</b> mines in 5 counties of NE Pennsylvania; they eliminated competition for coal by refusing to carry coal of independent mines (except under onerous tolling contracts); in early 1830s excess mine capacity developed; in 1870s dual ownership accelerated, even though PA constitution outlawed it from 1874; in 1873, top 5 RRs carried 90% of coal to Tidewater points; by 1900, the railroads controlled 62% of coal production, and in 1904-1923 it was 70%; court testimony in 1908 revealed that Reading RR was the collusive price leader; from 1864 to 1927 there were at least 11 documented episodes				
160A. First episode: NYC prices fell 54% 1864-72; various pool agreements began Jan. 1873 with 5 members; first cartel episode ended August 1876 but was renegotiated quickly	Curtis interprets "Pooling agreement" of 1873 that set supply limits; immediate effect on Eastern Tidewater price of coal compared with before 1873 price	38	--	Curtis (1931:343), Jones (1914)
160B. Second episode: August 1876 to	Same method as above for what	0	--	Curtis (1931:343),

December 1877	Curtis calls the “1876 pool agreement”; Jones writes that pool unable to agree from Aug. 1876 to Dec. 1877			Jones (1914)
160C. Third episode: 1886; Jones says that this episode was 3/1886-12/1891; [note that Curtis omits mention of three successful pools that began 1/1878, 1879, and 12/1884].	Same method as above for 1886 pool agreement, which Curtis interprets as ineffective	0	--	Curtis (1931:343), Jones (1914)
160D. Tenth episode: 1907; [Curtis also omits mention of the pools that Jones judges to be effective that began in 1/1892, 2/1896, and late 1902]	Same method as above for 1907 pool agreement	0	--	Curtis (1931:343), Jones (1914)
160E. eleventh episode: 1921-26; Curtis notes that during 1923-27, average profit rates for railroad-owned anthracite mines were 14 times the rates of the seven railroads carrying the largest volume of coal	Easter Tidewater price in 1921-1926 corrected for inflation compared to the 1913 price	50	--	Curtis (1931:344)
160F (not used)				
160G. Same as 160A; Jones’ “first pool” of Jan. 1873 to Aug 1876; concentration of coal-tonnage hauling was high (HHI=1809)	Compares average 1873-75 prices of all grades f.o.b. NYC per long ton with 1872 price; peak year was 1875	32.2	37.5	Jones (1914: 41-42, 228)
160H. Same as 160A	Compares average 1873-75 prices of all grades f.o.b. NYC with 1877 price; peak year was 1875	108.1	116.4	Jones (1914: 41-42, 228)
160I. Fourth episode is Jones’ “2 <sup>nd</sup> pool” of Jan. 1878 to 12/31/1878; concentration fell slightly (HHI=1789)	Compares average 1878 prices of all grades f.o.b. NYC with 1877 price	29.1	--	Jones (1914: 45, 228)
160J. Same as 160I for 2 <sup>nd</sup> pool of Jan. 1878 to 12/31/1878	Compares average 1878 prices of all grades f.o.b. NYC with 1879 price	34.6	--	Jones (1914: 45,228)
160K. Fifth episode is Jones’ 3 <sup>rd</sup> pool of 1880-1884; unlike previous pool, no formal association was formed, just a “friendly understanding” after negotiations in 1879	Compares average 1880-84 prices of all grades f.o.b. NYC with 1879 price	56.9	--	Jones (1914: 46-47, 228)
160L. Sixth episode: Jones’ 4 <sup>th</sup> pool of Dec. 1884 to end of 1885; despite high concentration (HHI = 2363), ineffective because Penn. RR dissatisfied with its quota share; Reading RR went bankrupt in 1884	Prices fell throughout cartel episode	0	--	Jones (1914: 47-48, 228)
160M. Same as 160C, Jones’ 5 <sup>th</sup> pool organized by J. P. Morgan in March 1886; agreement in effect April 1886-Dec 1891, but set total output too high, so prices fell in 1891; HHI=2288	Compares average 1888-1890 prices of all grades f.o.b. NYC with 1891 average price	7.9	--	Jones (1914: 49, 228)
160N. Seventh episode: Jones’ 6 <sup>th</sup> pool effective Jan. 1892 to late 1894; dissolved sometime in 1895; Reading RR failed again in 1892, so this year is ignored for price analysis	Compares wholesale price of long ton of “stove coal” f.o.b. NYC in 1893-94 with 1895; peak year 1893	24.4	33.8	Jones (1914: 156-157)
160O. Episode 8: Jones’ 7 <sup>th</sup> pool; after numerous secret meetings among 11 railroads that controlled 100% of coal hauling (HHI=1105), in effect 2/1/1896 to late 1897; in early 1897 mines operated only 5-10% of the time; nearly perfect adherence to quotas until recession of 1898 leads to cheating; 1898-99	Compares wholesale price of long ton of “stove coal” f.o.b. NYC in 1896-97 with 1895; peak year 1897	24.6	28.1	Jones (1914: 55-58,156)

termed normal, competitive years				
160P. Same as 160O	Compares wholesale price of long ton of “stove coal” f.o.b. NYC in 1896-97 with 1898-99	4.0	--	Jones (1914: 58, 156)
160Q. Episode 9: Jones’ 8 <sup>th</sup> pool of late 1902 to 1911; RRs solved low concentration problem by RR mergers, cross-ownership, interlocking directorships, and elimination of rival mines (by 1907 RRs controlled 78% of all coal output; labor strikes in late 1900 and mid 1902 boost costs; during 1903-11 monthly prices nearly constant; collusion “nearly perfect” (p.180) despite 1908 antitrust trial and conviction.	Compares wholesale price of long ton of “stove coal” f.o.b. NYC in 1903-11 with 1898-99 prices adjusted upward for changes in total costs of mining	12.3	12.4	Jones (1914: 59-97, 156-157)
161A. Japanese <b>public-works construction</b> bid rigging, several cases discovered roughly 1970-1990; parameters are verified by guilty judgments in legal suits	Using data on the average number of bidders (10) and comparable Canadian data on the spread in bidders’ costs, a mathematical model of competitive bidding can simulate the difference between the competitive and collusive price; an elaborate yardstick method	19-50	--	McMillan (2002:141-147), McMillan (1991:208)
161B. Same as 161A	Summary of estimates of scholarly Japanese studies and government commission findings	30-50	--	Woodall (1996: 48)
162. The Star Friendship Association with about 100 corporate members rigged bids on <b>U.S. naval shipyard construction projects</b> in Japan in “the 1980s” (ca., 1981-1988); the Japan FTC investigated and fined the firms in 1989; after a threat of a U.S. suit, the association paid \$32.6 million in compensation	Statements by U.S. government officials of the “low-end estimate” of the U.S. Navy’s losses due to bid rigging, which were 8% higher than the firms’ payout	32-35	--	McMillan (1991:209), <i>Time Magazine</i> (1/15/90), <i>New York Times</i> (11/24/89), <i>Los Angeles Times</i> (11/26/89)
163. Bid rigging on a <b>kitchen construction project</b> in Matsuyama City, Japan in 1982; bidders were convicted in court; average pre-tax operating income of civil engineering firms in Japan 1966-89 was 5.6% of total assets	Japanese court decision that total profits by the winning firm were an excessive 31% of revenues; I subtract 4-12% of sales as a normal profit	23-37	--	McMillan (1991:210-212), <i>Kensetsugyo Dokukin Mondai Kenkyukai</i> (1984)
164. Bid rigging on a <b>river-dredging project</b> in Tsukuba City, Japan in 1979 ; tried in court	Prosecution estimate of the excess profits made by the winning bidder	37	--	McMillan (1991:210)
165. Bid rigging among companies that delivered <b>soil and gravel</b> to build Kansai, Japan Airport in late 1980s	Comparison of winning bid with the government’s (generous) ceiling price	9.7	--	McMillan (1991:210)
166. <b>Coal</b> cartels were formed by London coal-dealers (wholesale merchants a/k/a Lightermen) to raise prices from 1595; Acts of Parliament against bid rigging were passed in 1642 and 1665; in 1729 a Parliamentary investigation found that 10 controlled 67% of purchases and blamed them for 1722-29 price increases; price controls for London were legalized in 1744, to be administered by three judges; in 1788 a law made any agreements among or partnerships of more than 5 coal buyers illegal “combinations in restraint of trade.”				Ashton and Sykes (1964), Levy (1927), Sweezy (1938), Hausman (1980), Tan (2003)

<p><i>Informal</i> collusion by mine owners on sales of coal sent on ships from Newcastle (the Tyne and Wear Rivers) to London, England began in 1699; Ashton and Sykes find written evidence of effective overt agreements in 1710, 1727-30, 1738-39, 1743-44, and 1765; the <i>formal</i> Northeastern <b>English Coal Gild</b> (a/k/a the <b>Newcastle Vend</b> or <b>Limitation of the Vend</b>) was formed by Northern mine owners in 1771; began as a monopsony to suppress wages and labor mobility; it controlled an average of 90-92% of London’s marketing late 18<sup>th</sup> century; supplies from Wales and Scotland constrained pricing 1800-1845 (simultaneously, the Vend reached its greatest degree of organizational sophistication); experienced many brief intermittent “fighting trades” (price wars) and at least 12 episodes. Parliamentary inquiries in 1691, 1703, 1729, 1730, 1800, 1829, and 1830 generally found that consumer complaints about price manipulation by miners and London buyers were “not unfounded”; in 1711, 1730-38, and 1744 Parliament passed “retstraining Acts”, but otherwise imposed no penalties; at its peak in 1831, 100% of Newcastle coal was controlled by the Vend; effective, periodic labor strikes began in 1831; the Vend endured for 75 years until 1844-45 when rail shipments of coal from the Midlands to London became significant.</p>				
<p>166A. 2<sup>nd</sup> episode: the first Vend agreement of 1771 began to collapse between late 1780 and early 1781; prices stayed low 1782-85</p>	<p>Rochester Harbor prices in shillings per chaldron in 1780 are compared to 1785</p>	<p>17</p>	<p>--</p>	<p>Levy (1927:116)</p>
<p>166B. Cartel reformed in 1786-87 with more elaborate agreements on monthly quotas for each mine and fines for overproduction; but, according to Levy, not effective in raising prices until about 1824 and lost control in 11/1832; Levy’s 3rd episode is 1824 to mid 1832; however, Sweezy identifies 7 effective cartel episodes from 1810 to 1832 and 3 more short ones after that (see 166C to 166N).</p>	<p>Comparison of before (early 1832) price for best grade of coal with lowest month’s price (June 1833) during the Nov. 1832-Aug. 1833 price war</p>	<p>--</p>	<p>56</p>	<p>Levy (1927:120), Sweezy (1938)</p>
<p>166C. Sweezy Episode 9: 1836</p>	<p>Price at the mouth of the Tyne River in 1836 compared to “pre-cartel” year 1823</p>	<p>22-27</p>	<p>--</p>	<p>Levy (1927:138-139)</p>
<p>166D. Sweezy Episode 10: 1844-1845</p>	<p>Same as 166C above, except price change from 1844</p>	<p>22</p>	<p>22</p>	<p>Levy (1927:161)</p>
<p>166E. First Sweezy episode: 1810-11</p>	<p>London price of best grade coal per chaldron before “open market” (competitive period) began in 1812</p>	<p>4-11</p>	<p>--</p>	<p>Sweezy (1938: 155)</p>
<p>166F. Sweezy Episode 4: 1823- July 1824</p>	<p>Same as 166E before open market of 8/1824-7/1825</p>	<p>12</p>	<p>--</p>	<p>Sweezy (1938: 155)</p>
<p>166G. Sweezy Episode 5: Aug. 1825- March 1826</p>	<p>Same as 166E above before open market of 4/1826-12/1826</p>	<p>16</p>	<p>--</p>	<p>Sweezy (1938: 155)</p>
<p>166H. Sweezy Episode 6: 1827- Feb. 1829</p>	<p>Same as 166E above before</p>	<p>12</p>	<p>--</p>	<p>Sweezy (1938: 155)</p>

	open market of 3/1829-8/1829			
166I. Sweezy Episode 7: Sept. 1829 - 1831	Same as 166E above before open market of 1/1832-3/1834	28	--	Sweezy (1938: 155)
166J. Sweezy Episode 2: 1813-14	London price best grade for 1-2 years after open market of 1812	11	--	Sweezy (1938: 155)
166K. Same as 166G	Same as above for open market of 8/1824-7/1825	7	--	Sweezy (1938: 155)
166L. Same as 166H	Same as 166E above for open market of 4/1826-12/1826	5	--	Sweezy (1938: 155)
166M. Same as 166I	Same as 166E above for open market of 3/1829-8/1829	9	--	Sweezy (1938: 155)
166N. Sweezy Episode 8: April 1834-1835	Same as 166E above for open market of 1/1832-3/1834	33	--	Sweezy (1938: 155)
166O. Same as 166D	Price change after the final collapse of the Vend in May 1845 when many small inefficient mines had closed, compared to late 1844 price	75	--	Sweezy (1938: 127, 155)
166P. Covers all 11 episodes of 1770-1845	Econometric models using annual data on wholesale prices; average of 11 episodes shown	6.9-7.8	--	Hausman (1984: 326)
166Q. 1 <sup>st</sup> episode: Covers the years 1699-1770 [no other author suggests that this was an effective Newcastle Vend episode]	Econometric model using annual data on retail prices paid by two London buyers	0	--	Hausman (1980)
166R. Covers years 1816-20	Econometric model prediction	15.1	--	Tan (2003: 22)
166S. Includes 166.F and years 1821-25	Econometric model prediction	12.9	--	Tan (2003: 22)
166T. Includes 166.H and years 1826-30	Econometric model prediction	12.2	--	Tan (2003: 22)
166U. Includes 166.N and years 1831-35	Econometric model prediction	12.4	--	Tan (2003: 22)
166V. Includes 166.C and years 1836-40	Econometric model prediction	16.1	--	Tan (2003: 22)
166W. Includes 166.D and years 1841-45	Econometric model prediction	15.9	--	Tan (2003: 22)
166X. Episode covers pre-Vend years 1727-29; during this period there were no wars or freezing of the Thames River (factors that raise prices).	A "Limitation Act" of Parliament restrained collusion in 1730-1738; Newcastle price in 1729 compared to 1730	58	--	Ashton and Sykes (1964: 212, 252-53)
166Y. Episode covers pre-Vend years 1739-1743; during part of this period (1739-40) there was a war, and the Thames River froze in 1739; thus, price change probably exaggerated.	A "Limitation Act" of Parliament restrained collusion in 1730-1738; Newcastle price in 1739 compared to 1738	37	--	Ashton and Sykes (1964: 212, 252-53)
166Z. Episode covers pre-Vend years 1739-43; during part of this period (1739-40) there was a war, and the Thames River froze in 1739; however 1743 was unaffected by either.	A "Limitation Act" of Parliament restrained collusion beginning in 1744; Newcastle price in 1743 compared to 1744	18.2	--	Ashton and Sykes (1964: 212, 252-53)
166AA. Same as 166A; during this period there were no wars or freezing of the Thames River	Newcastle price in 1781 compared to 1786	20.6	--	Ashton and Sykes (1964: 214, 252-53)
166BB. Refers to bid rigging by Lightermen in approximately 1700-02; during 1702-04 there was a war, but no freezing of the Thames River	Authors quote from a book that quotes the advance in retail prices from early 1700 as soon as buyers begin "engrossing" the coal supply	4.7-7.0	--	Ashton and Sykes (1964: 219, 252-53)
166CC. Refers to bid rigging by Lightermen in approximately 1723-29; during this period there were no wars or freezing of the Thames River	Parliamentary report charts increase from 1722 to 1729	21.7	--	Ashton and Sykes (1964: 219-20, 252-53)
167. The <b>Birmingham Bedstead Makers' Alliance</b> successfully raised prices on metal bed frames from 1891 to 1900; ended because of imports from European continent	Simple comparison of 1891-1900 prices with pre-1891 prices	100	--	Levy (1927:200)

168A. The <b>British Salt Union</b> was formed in Oct. 1888 by 64 firms that controlled 91% of UK <b>white salt</b> (a/k/a “common salt”) supply, much of it exported; coal accounts for 90% of the cost of production; the Salt Union was acquired by ICI in 1937; mergers from 1945 to 1975 produced a virtual UK duopoly (see No. 215 below).				Levy (1927), UK Monopolies Commission (1990), McCrosty (1907)
168A. Salt Union raised UK prices strongly in Nov. 1888 to end of 1890; prices fell 1891-1898	Average export prices in 1878-1887 (the yardstick) compared to 1888-1891, corrected for the increase in coal prices	-1	--	Levy (1927:243), UK Monopolies Commission (1990)
168B. Same as 168A; evidence of geographic price discrimination	Average prices in the county where salt was produced in 1888-91 compared to 1878-87, corrected for increase in price of coal; prices briefly peaked in 1888	19	320	Levy (1927:243, 295)
168C. New salt producers entered in early 1890s and by 1892 began to depress prices, though they never dipped below 1878-87 levels; from 1888 to 1905, the cartel formed side agreements with non-Union mines, but entry continued and collusion formally ended late 1905 or early 1906; by 1907 former members of the Salt Union controlled only 46% of UK production; although domestic power waned after 1907, power over export prices continued.	Change in export prices from 1904 to 1907	13	--	Levy (1927:243)
168D. The drop in domestic prices from 1904 to 1906 caused a new cartel, the <b>North-Western Salt Co.</b> , to be formed in October 1906; achieved nearly 100% market control through at least 1927; used supply controls and fixed members’ shares; profits in 1907 rose 46% over 1906 levels and were 355% higher in 1925	Change in export prices 1906-1907	9.1	--	Levy (1927:244)
168E. Same as 168A	Immediate change in price of common salt f.o.b. works from 10/1888 to 2/1889	--	100-133	Calvert (1913: xxiii)
168F. Same as 168A	Same as 168D above, but for prices of “fine” grade salt	--	100	Calvert (1913: xxiii)
168G. Same as 168A	Change in works price of finest “brisk” grade from 11/1888 to 9/1890	100	--	Calvert (1913: 15)
168H. Same as 168A	Same as above for 9/1890 to 3/1891	75	--	Calvert (1913: 15)
168I. Same as 168A	Same as above for 3/1891 to 8/1891	50	--	Calvert (1913: 15)
168J. Same as 168A	Comparison of “brisk” grade export price with UK price in 3/1889 to March 1891	52	--	Calvert (1913: 18-20)
168K. Same as 168A	Comparison of Prussian Rock Salt sold to chemical manufacturers versus all others, 12/1888 to 12/1889	38	--	Calvert (1913: 18-20)
168L. Same as 168A	Peak price in 4/1889 was	--	91	McCrosty (1907:

	10.5s., avg. in 1887-88 was 5.5s.			181-83)
168M. Same as 168A	Prices of exported “lump” salt in 1888-89 compared with 1898-1906; peak is 1890	10.5	16.4	McCrosty (1907: 181-87)
168N. After a period of very low prices 1880-85, a combination was formed in 1885; failed summer of 1888; purchased by Salt. Union	Cartel had only “feeble” effects on UK prices	1	--	McCrosty (1907: 181-87)
169A. The European <b>steel rails</b> cartel included the leading manufacturers of the UK, Germany, and Belgium; first formed in 1883, but first episode was unstable until French producers joined in 1907 (2 <sup>nd</sup> episode), which ended August 1914	UK rail prices in 1907 compared to the 1904-06 average	35-75	--	Levy (1927:268)
169B. First episode 1883-1907; with a US-UK price difference of 12% in 1901, large US exports to UK had occurred, but there were none in 1907	UK prices compared to US export prices	21-25	--	Levy (1927:268)
169C. Same as 169B	Compares 1900 domestic German price with (yardstick) price of exports to Portugal	26	--	Hirst (1905: 115)
170. In 1902, German manufacturers of <b>thorium nitrate</b> were able to monopolize the only world source in Brazil of monacite, the key raw material; supply reduction raised price of thorium; ended sometime after 1904	The price of saltpeter in Germany in 1904 compared to early 1902	56	--	Levy (1927:295)
171A. A study of three <b>British ocean shipping conferences</b> 1870-1913; focus is on 47 episodes of entry and 15 price-fixing episodes punctuated by 14 predatory price wars, each from 2 days to 1 year long precipitated by entry; all wars saw price changes of at least 30%; no line lost money	Price during war compared to rate before war, average of 4 episodes 1891-1902	60	75	Scott-Morton (1997:693)
171B. Same as 171A above	Price during war compared to two episodes after war when entrant was admitted to cartel	49	75	Scott-Morton (1997:693)
172. Study of the determinants of all price wars among U.S. <b>passenger airlines</b> 1978Q2 to 1995Q4; discussion assumes that conduct observed is tacit collusion by price leadership, but later convicted of illegal signaling, a facilitating collusive device.	Econometric study, but no averages given	15-25+	--	Morrison and Winston (1996)
173. Buyers’ cartel by 23 elite U.S. universities that met to fix the (purchase) price of <b>needs-based graduate scholarships</b> from 1958 to 1991; 22 found guilty by U.S. court, but DOJ settled (by means of a consent decree) with one university that appealed	Both econometric studies find that income was redistributed from high- to low-income applicants, but no average price effects	0	--	Carlton <i>et al.</i> (1995), Hoxby (2000)
174. Bid rigging by more than 2000 <b>building construction</b> companies in northern <b>Germany</b> in 1959-1973; 559 were prosecuted by the Federal Cartel Office (BKA), which provided a written report to the OECD on the 8000 projects	Federal Cartel Office analysis of overcharges on the 8000 projects	9	--	OECD (1976:24)
175. A report of the French Technical Commission on Cartels and Dominant Positions to the OECD on bid rigging on public tenders	Estimated by the reduction in the winning bid on the same project after the cartel was	20	--	OECD (1976:26)

in <b>electrical wiring construction</b> ca. 1975	disciplined			
176. Same as 175 above, except for <b>construction of a Mirail University building</b> ca. 1970 - 1975	Same as 175 above	40	--	OECD (1976:26)
177. Same as 175 above, except for <b>road building project in France</b> in 1968	Same as 175 above	22	--	OECD (1976:26)
178. Based on a Japan FTC prosecution of Yuasa Timber Co. and 64 other <b>plywood manufacturers</b> that made identical bids for a public tender ca. early 1970s	JFTC report that found that the identical bids were exactly 10% higher than the previous winning bid for the same product	10+	--	OECD (1976:37)
179. The Northern Collieries Association fixed the price of <b>black coal</b> in the Newcastle, Australia region in six episodes from 1855 to 1893; the NCA accounted for 85% of colonial supply in the 1860s, but slipped to 60% by 1900				Flemming (2000:50)
179A. First episode began with 2 mines in 1855, but high prices quickly (by ca. 1856) induced large-scale entry	Price increases ineffective in the long run	0	--	Flemming (2000:50)
179B. Second episode: 1861-62	“Price increases” only in the short run	1	--	Flemming (2000:50)
179C. Third episode: 1865-66	“Price increases” only in the short run	1	--	Flemming (2000:50)
179D. Fourth episode: mid 1866-1868	Comparison of real prices of “Northern” coal in 1867-68 with early 1866 price	30		Flemming (2000:50)
179E. Same as 179D	Comparison of real prices of “Northern” coal in 1867-68 with 1870-72 average price	30	--	Flemming (2000:50)
179F. Fifth episode: 1874-1880	Comparison of real prices of “Northern” coal in 1874-80 with 1872 price	55	--	Flemming (2000:50)
179G. Same as 179F	Comparison of real prices of “Northern” coal in 1874-80 with 1881 price	80	--	Flemming (2000:50)
179H. Sixth episode: 1882-1893	Comparison of real prices of “Northern” coal in 1882-93 with 1881 price	46	--	Flemming (2000:50)
179I. Same as 179H	Comparison of real prices of “Northern” coal in 1882-93 with average 1895-1900 price	34	--	Flemming (2000:50)
180A. The <b>UK Linoleum</b> Manufacturers Association formed in 1905, formalized in 1934, was judged to have engaged in a long list of horizontal and vertical restrictive practices through 1955 that were anticompetitive; agreements with other European assns. guaranteed a UK monopoly for the LMA (see #137 above); the LMA controlled 80% of the market in 1955; setting common prices; though “not against the public interest,” pricing was deemed “perilous” by the Commission.	The two UK nonmembers sell linoleum of the same quality and grade at prices 10% below LMA members	10	--	UK Monopolies Commission (1956b:26,66)
180B. Same as 180A	The Commission seems to suggest that the “loyalty rebate” awarded to all LMA-“approved wholesalers” is a (rent-seeking)	12.5	--	UK Monopolies Commission (1956b:28)

	yardstick of the cartel overcharge			
180C. Same as 180A for episode early 1887 to 1904	Pool kept prices at a constant \$28/t from 1887 to 1904, except for one brief, “ruinous” price war in (late?)1887	--	87	Seager and Gulick (1929:90-91)
181A. The British <b>Non-Ferrous Metals</b> Federation was created in 1945 by the merger of 12 metals associations, one founded in 1875; had 69 members in 1945 covering semi-manufactured copper, brass, zinc and nickel alloys; set common prices in UK and since 1946 in exports under the Lausanne Agreement, which protects UK market from European exports; many other restrictive practices that Commission says “operate against the public interest” and “keep prices up” ; ended 1955	In July 1946, export prices to British Commonwealth countries were raised by £7 to 10 at a time when (yardstick products) copper wire, strips, and tubes sold elsewhere for £242-415/tonne	2-4	--	UK Monopolies Commission (1955: 58,102-03, 208-11)
181B. Same as 181A	Same as 181A above, but £10-21 increase to non-Commonwealth countries	4-8	--	UK Monopolies Commission (1955: 58,102-03, 208-11)
182A. The UK Cable Makers Association, formed 1899, and Covered Conductors Assn. had 22 members in 1950 with 65-69% of UK market for <b>insulated wires and cables</b> ; prices fixed on exports from 1928 when Intl. Cable Development Corp. formed for power distribution cables; ended 1952	UK parliamentary Standing Committee on Trust reported that in 1921 non-CMA firms sold at 10% lower prices than CMA members	10	--	UK Monopolies Commission (1952a: 17)
182B. Same as 182A	Loyalty rebates in 1948 are rent-seeking portion of overcharge	10.0	--	UK Monopolies Commission (1952a:75)
182C. Same as 182A	Commission seems to suggest that profit/sales of 10% is reasonable; subtracted 10% from average actual profits on 7 types of cables	14.4+	--	UK Monopolies Commission (1952a: 167)
183A. The British Electrical & Allied Manufacturers Assn set common prices and terms of sale for 84% of the UK’s market for <b>large electric power equipment</b> ca. 1930 to 1957; covers 37 lines of business; cooperates with the Intl. Elec. Assn. on exports; analysis of price effects 1950-1957	In early 1950s, a yardstick firm, the Central Electric Authority, paid 5-15% lower prices on small transformers of same quality from non-BEAMA firms	5-15	--	UK Monopolies Commission (1957a: 169-77)
183B. Same as 183A	A large industrial firm got 13 bids for 1000 KVA transformers in Jan. 1949; 3 non-BEAMA bids were lower than 10 BEAMA firms	12.3	13.1	UK Monopolies Commission (1957a: 177)
183C. Same as 183A	Another large industrial buyer got lower bids from nonmembers on a tender for 17 transformers (10 to 4000 KVA) in 1951-53	8.5	21.5	UK Monopolies Commission (1957a: 178)
183D. Same as 183A	North Scotland Electric Board reports lower bids from nonmembers on small transformers of identical quality	5	--	UK Monopolies Commission (1957a: 178-79)
184A. Since 1905 the Electric Lamp	In 1933-35, UK chain stores	37-66	--	UK Monopolies

Manufacturers Assn. of Great Britain fixed common prices and standardized product quality; 8 members (two dominant) have 90-95% control of UK <b>electric bulb</b> market; ELMA is affiliated with Phoebus (#21 above); price fixing is condemned; ELMA largely prevented superior long-life bulbs from being sold; ended 1951	sold Japan-made bulbs at lower retail prices than ELMA members			Commission (1951: 13), Prais (1974)
184B. Same as 184A	In 1939 5 firms not in ELMA sold 60W general-service filament bulbs of same quality to chain stores at 68-71% lower price than ELMA firms; after acquisition in 1950, prices only 31-32% lower	54-57	--	UK Monopolies Commission (1951: 41)
184C. Same as 184A	Price charged by intl. cartel in Sweden of most popular size bulb in 1930 when local consumer cooperative's bulb factory was being built, compared to ca. 1929 before construction began	28.0	--	Great Britain Board of Trade (1944: 126)
184D. Same as 184A	Same as above, except cartel's price change from 1929 to 1931 after cooperative's plant was on stream	39	--	Great Britain Board of Trade (1944: 126)
184E. Same as 184A	From 1931 to 1936, Swedish cooperative yardstick price declined 23% to 0.71 shillings, but cartel could not match it; peak is cartel's price reduction from 1929 to 1936	5.6	50	Great Britain Board of Trade (1944: 126)
185. German <b>wire</b> cartel in operation in early 1900s (ca. 1900-04)	Compares 1900 domestic German price with price of exports	38	--	Hirst (1905:115)
186. German <b>nail</b> cartel in early 1900s (ca. 1900-04)	Compares 1900 domestic German price with price of exports	44	--	Hirst (1905:115)
187. German <b>steel girders</b> cartel active in early 1900s (ca. 1900-04)	Compares 1900 domestic German price with price of exports to Belgium and Netherlands	20-30	--	Hirst (1905:115)
188A. The U.S. <b>arc-light carbon</b> industry began in 1879 and attempted to fix prices 3 times between 1885 and 1887; the first successful episode was by six leading firms in late 1886 (ca. 8/1886-12/1886)	Price increase from early 1886 to late 1886	20	--	Passer (1953: 60)
188B. Episode 2: ten leading firms with 75% of supply agreed to raise prices on April 15, 1887; ended because of large scale entry in July 1887 and inability to control coke (principal ingredient) supplies	Prices in mid 1887 compared to early 1887	100	--	Passer (1953: 61)
189A. U.S. <b>incandescent electric light bulb</b> industry became unconcentrated because the validity of GE's Edison patent was in doubt until a 1891 court decision affirmed its validity; in August 1896 GE made a price-fixing	Change in price of light bulbs reported by Passer of various sizes from before cartel (1895-early 1896) to late 1896 and some time afterwards	11-67	--	Passer (1953:162-163), Bright (1949: 103-104, 144-156)

agreement with 6 other leading manufacturers through the Incandescent Lamp Manufacturers association; 10 more joined by 1901; cartel became a monopoly when smaller companies merged into a holding company controlled by GE in 1901-11; cartel controlled 95% of U.S. market for several years; federal antitrust suit and consent decree issued 1911 disbanded the monopoly				
189B. Same as 189A. Bright reports that the price of a 16-candlepower lamp was \$1.00 in 1890-1896, but then fell steadily to early 1896 as large numbers of new manufactures entered production, but did not fall below the late 1886 “pool price” until it reached \$0.17 in 1910; virtual monopoly formally dissolved 1911	The “pool price” of \$.20 for 8- to 25-candlepower carbon-filament bulbs from late 1896 to about 1909 compared to prices (\$0.12 to 0.18) in early 1896	11-67	11-67	Bright (1949: 93, 103-104, 144-45, 151), U.S. Tariff Commission (1938: 32)
189C. General Electric’s major electric bulb patents expired in 1929, ending the US monopoly period that began 1912; GE had a no-export agreement 12/1924-9/1939 with the international cartel (see cartel 21), but Japanese imports into US surged 1929-1933 until a dumping suit brought by GE resulted in higher tariffs.	Prices in US of a 60-watt tungsten-filament bulb (\$0.20) compared with yardstick: pre-tariff Japanese imports (\$0.08) and corrected for quality (US-made bulbs lasted twice as long)	20	20	Bright (1949: 262-269)
190. Major oil fields discovered in Texas and Oklahoma 1926-31 doubled U.S. reserves, causing price of <b>crude petroleum</b> to fall 92%; private cartelization attempted ca. 1926- Sept. 1933 resulted in an “imperfect cartel” that was “quite ineffective”; entry at small scales was easy; even imposition of legal quotas from 1929 by TX and OK state commissions was observed by only the top 25 producers that had 1% shares or more	Change in price per bbl. from 1926 to 1932 due mainly to huge shift in supply and some general deflation; no quantitative analysis of whether price decline was slowed by sporadic supply controls.	1	--	Wiggins and Libecap (1987)
191A. U.S. Webb-Pomerene <b>crude sulfur</b> association Sulexco effective in raising U.S. domestic prices for 50+ years 1922 to about 1973; by 1927 Sulexco successfully practicing price discrimination by keeping export prices about 25% higher than domestic	Average 1922-1940 prices compared to 1919-1920 price; peak is 1932	55.1	242	MacKie-Mason and Pindyck (1989:203-210)
191B. Same as 191A	Average 1922-1940 prices compared to long-run marginal costs; peak is 1932	16.6	57.3	MacKie-Mason and Pindyck (1989:203-210)
191C. Same as 191A	Authors use 1928 to illustrate U.S. price effects	147	--	MacKie-Mason and Pindyck (1989:206)
191D. Same as 191A, except 1947-1973 when Sulexco’s power was waning	Average 1947-67 prices compared to 1973 price; peak is 1955	60.6	103.5	MacKie-Mason and Pindyck (1989:203-210)
192A. British Radio Valve Assn., formed in 1926, had 10 members in 1954-56 that controlled 97% of sales in the UK market for <b>cathode ray and electronic vacuum tubes</b> ; BVA exclusively supplied all UK manufacturers of radio and TV sets; fixed prices and terms of sale to manufacturers, wholesalers and retailers; condemned as “against the public interest”; ended Sept. 1956	Largest set makers (80% of sales to mfgs for new sets only) get 70-80% discount off list, smaller (20% of sales) got only 50-60% discounts	4	--	UK Monopolies Commission (1957b: 38-45,108-109)

192B. Same as 192A.	Analysis based on 1953-54 sales of tubes by #1 firm (Phillips with a 59% share); Phillips' price-cost margin on sales under BVA agreement was 16% higher than non-BVA sales; yardstick is PCM difference (-21%) of 9 smaller members	--	37	UK Monopolies Commission (1957b: 71)
192C. Same as 192A; at this time US imports were large (20% of UK sales) and subject to a 33% import duty, and a large number of consumers built their own radio sets	Compares 1936 retail prices of sales to retail customers through hobby magazines of a large variety of BVA-made tubes with U.S.-made tubes	160-175	--	UK Monopolies Commission (1957b: 71-80)
192D. Same as 192A	Price of BVA tubes in 1936, sales by leading UK wholesalers, compared to same tubes imported from US	20-27	--	UK Monopolies Commission (1957b:71-80)
192E. Same as 192A,	Median post-cartel price reduction of a change in 1955 BVA list prices of radio tubes, effective 9/56 in reaction to the impending (12/56) negative finding the UKMC on the 9 most common models; range was from 11% to 33%, simple average 16.0%	12.5	33	UK Monopolies Commission (1957b: vii, 71-80 )
192F. Same as 192A	Median price reduction of 1955- August 1956 list prices of cathode ray tubes on the 3 most common models of cathode ray tubes; range was from 14.3% to 18%, simple average 15.5%	14.3	18	UK Monopolies Commission (1957b: vii, 71-80 )
193. Bid rigging against the <b>Korean</b> government by 26 <b>road construction</b> firms in 1998-99 building the Western Coast Expressway; fined in 1999	The average deviation of three winning bids from the government's pre-qualification review, compared to yardstick of the same ratio for all contracts	9.1-17.3	--	KFTC report to OECD (6/7/2001: 5-6)
194 The <b>U.S. salt</b> industry began with solar drying on the East Coast, though most of the supply was imports – ballast in sailing ships from the UK. In the 19 <sup>th</sup> cent. NY, WV, and MI became the main Eastern sources, using brine from wells, then dried with wood scraps or coal fires. Until transportation costs declined, salt markets were highly localized. Most regional cartels could not control fringe production for more than a year or two; attempted interstate cartels were not successful. Real secular prices declined in 19 <sup>th</sup> cent.				Jenks (1888), Levenstein (1995: 578-86)
194A. The <b>Michigan Salt</b> Association operated from April 1868 to at least 1888; supplied northern US west of Pennsylvania; controlled 75% to 95% of MI production; ineffective in raising prices for most of its existence but	MI prices per bbl. in 1868 compared to linear price trend in the competitive periods during 1866-1877	13.8	--	Jenks (1888:92)

enjoyed first brief success in 1868				
194B. Same as above, except second episode May 1881 to March 1882	May 1881 to March 1882 prices, compared to average monthly prices June 1880 to April 1881	22.6	--	Jenks (1888:94)
194C. Same as 194B	May 1881 to March 1882 prices, compared to average monthly prices April 1882 to Mar. 1883	28.7	--	Jenks (1888:94)
194D. Episode 3, approx. 5/1887-8/1887	Prices in mid 1887 compared to early 1887	6.1	--	Jenks (1888:92)
195A. A summary of a large number of federally prosecuted instances of bid-rigging in <b>U.S. road construction</b> , mostly in the late 1970s and early 1980s	Various methods, used by the Dept. of Justice, not discussed	10	--	Werden and Simon (1987:925)
195B. Not clear, but appears to be same as 195A; cases ended between 1984 and 1987, but cartels probably operated 1975-1985; mostly construction projects financed by governments	Survey of 7 U.S. convictions, commissioned by the U.S. Sentencing Commission ; mean and median; peak is maximum case; methods of calculation unknown	20	35	Cohen (1989b: 607), Cohen and Scheffman (1989: 347)
196. A summary of an analysis of seven 1984-1987 U.S. federal court final decisions in <b>bid-rigging in construction and other industries</b> involving a total of 12 defendants.	Trial decisions of a judge or jury based on direct testimony and perhaps other methods	20	35	Cohen and Scheffman (1989:347), Cohen (1989b)
197. <b>High fructose corn syrup (42 and 55)</b> raised prices in the US market from Jan. 1989 to June 1995; the 5 defendants in a U.S. civil suit settled in mid 2004	Estimated from the increase in USDA-reported wholesale list prices in 1986-87 and expert opinions in plaintiffs' briefs; peak is HFCS-55 in 1991	9.9-15.7	33.2	Connor (2003: Table A.3)
198. <b>Carbon fiber</b> ; 1993 to May 2002; under US DOJ investigation	Press reports of rise from pre-cartel prices	25	--	Connor (2003: Table A.4)
199. <b>Aluminum metal</b> ; Feb. 1994 to Feb. 1996; some quasi-official national trade associations were members and openly signed a Memorandum of Understanding; investigated by US DOJ but not indicted, possibly because of international comity reasons (not an extension of #18 above)	Increase in prices in June 1994 relative to Nov. 1993 pre-cartel prices; caused in part by increased demand	30+	--	Connor (2003: Table A.4), Jenny (2003), Stiglitz (1998:176)
200. <b>Tobacco leaf</b> ; bid rigging against sellers in US auctions 1996-2001; antitrust class action by 400,000 growers and quota holders settled by 4 defendants May 2003; trial for remaining manufacturer scheduled for 2004	Preliminary minimum yardstick estimate made from settlement worth \$1,400 million; gross farm sales from USDA data are \$15,588 million	9.0+	--	Connor (2003: Table A.6), <i>Legal Times</i> (6/21/2004)
201A. <b>Linerboard</b> ; 10/1993 to 11/1995 in US market; US civil court case resulted in eight firms settling	Settlement of \$202 million is asserted to amount to about 50% of the overcharge; benchmark is pre-cartel price; peak occurred at end of cartel	42-55	96	Connor (2003: Table A.6), <i>Legal Intelligence</i> (4/22/2004)
201B. Same as 210A	Judge's decision in <i>Linerboard Antitrust Litigation</i> is that the \$203 mil. settlement is 42-55% of damages	6.6-8.6	--	Davis and Lande (2007: Case 18), Connor (2007a)
202. <b>Carbon dioxide</b> ; Jan. 1968 to Nov. 1992 in US market civil case settled 7/1996 just days before trial was to begin	Estimated from Court comments on overcharge during fairness hearing on fees	16.5	--	Connor (2003: Table A.6)
203A. Two drug companies (US and French)	The patent holder of Cardizem	16-32+	--	Connor (2003: Table

conspired in 7/98-6-/99 to monopolize the US market for <b>Cardizem CD hypertension drug (diltiazem hydro-chloride) and generic equivalents</b> ; the French firm paid the US generic manufacturer \$10 million per quarter not to enter the market; private antitrust damages suit settled for plaintiffs in 2002; motion to dismiss denied 6/13/2003	paid a maker of a generic substitute \$90 million as profit compensation to withhold the generic from the market; this is likely to be half or less of the monopoly profits earned by both companies			A.6)
203B. Same as 203A; the FTC issued an analysis and a consent decree to cease and desist private contracts to delay the introduction of generic drugs; FTC decision is contrary to decision of court in private damages suit	The FTC analysis states that the payment did not in fact delay entry by the US firm or other generic firms beyond what is prescribed by the Hatch-Waxman Act; the payment was 13.3% of affected sales	0	0	FTC (4/2/2001)
203C. Same as 202A	US District Court decision of 2/2/2004 (p.6)	8.2	--	Lande and Davis (2006:38-40), 2003 U.S. Dist. Lexis 25638
203D. Same as 203A	Plaintiffs' expert estimated overcharge is \$55 million , probably an econometric model	7.2	--	Lande and Davis (2006:15-20), Connor(2007a)
204. <b>Asphalt, liquid</b> ; Alabama bid rigging 1971-78; class-action suit of 133 government units was initiated in 1979 and settled a few years later	Overcharge is shown in Figure 2; based on an econometric model	126	165	Kamerschen and Morgan (2004:690)
205A. The <b>Almond</b> Board of California, a group of elected industry representatives operating under a USDA-enforced Marketing Order, controls 95% of the US market and two-thirds of the world market with inventory; cannot control tree plantings and sells to a concentrated processing sector; from about 1935 to 2004	An econometric model applied to 1962-1997 data predicts a Lerner Index for the US market that is 63% below the monopoly price	37.7	--	Crespi and Chacon-Cascante (2004:10)
205B. Same as 205A	Same as above for the world export market; the Lerner Index is 66% below the monopoly price	25.6	--	Crespi and Chacon-Cascante (2004:12)
206. Four-fifths of the world <b>coconut oil</b> market is controlled by a Philippines processors' export cartel after 1972 that was composed of 7 companies	An econometric model applied to 1959-1987 data to predict a Lerner Index for the pre-cartel (0.41) and cartel period (.89) 1973-87	739	--	Buschena and Perloff (1991: 1007)
207A. <b>Fluid milk</b> in the US is controlled by USDA-mandated <b>Marketing Orders</b> ; mid 1930s to 2004	Econometric model applied to producer (blend) prices in 38 markets (1960) and 46 in 1970; peak is 1970	14.4	17.8	Kwoka (1977:377)
207B. Same as 207A	Slightly different econometric model applied to 1973 blend-price data; range depends on elasticity of supply of raw milk	3.0-4.4		Ippolito and Masson (1978:54)
207C. Same as 207B	Effect on consumer prices is net effect of increases in fluid-milk products and decrease in manufactured-milk products	3.6	--	Ippolito and Masson (1978:55)
208A. Attempts to collude in the <b>U.S. raisin</b> market began as early as 1889, but middlemen	Cost data showed that growers' production coasts were at most	257	329	Jenks and Clark (1929: 132-34 and

countervailed; in 1913 the California Associated Raisin Co. (later Sun-Maid Raisin Growers) was formed with 9000 members and 76% of supply under control; by 1917 control rose to 90%; defectors from the cooperative's supply contracts were fined; acreage limits were imposed; in June 1920 Sun-Maid was found by the FTC to be illegally restraining trade; the Justice Dept. tried and failed to enjoin price increases in 1919 and 1920; in 1922 price fixing by farmers' was legalized.	\$0.015/lb.; grower prices for Muscat raisins were \$0.035/lb. in 1913-1915; a joint Dept. of Justice-FTC report stated that 1919-1920 prices were unreasonably high at an average of \$0.125/lb.; peak was \$0.15 in 1920			chart); Committee on the Judiciary (1921: 48-53)
208B. Same as 208A.	Wholesale prices for Muscat raisins were \$0.07/lb. in 1913-1915; a joint Dept. of Justice-FTC report stated that 1919-1920 prices were unreasonably high at an average of \$0.186/lb.; peak was \$0.2225 in 1920	166	218	Jenks and Clark (1929: 132-34 and chart); Committee on the Judiciary (1921: 48-53)
208C. The <b>California raisin marketing order</b> controlled by USDA mandate a reserve pool through an elected board or industry representatives since 1949; three joint products are made: raisins, fresh grapes, and raisins; price stabilization is achieved.	Authors develop a complex econometric model of the US industry for 1963-1984, with 9 no-control scenarios; grower prices for juice grapes rise slightly but fall by a nearly equal amount on raisins and by a larger amount for fresh; net returns virtually zero	0	--	French and Nuckton (1991: 591)
209A. The <b>California-Arizona navel orange USDA marketing order</b> (1934-present) controls the supply of about 75% of US winter orange supplies; because of a freeze in Florida, the restrictions on selling fresh oranges were unexpectedly suspended in 1985	Predict the negative effect on FOB grower prices during the suspension of the marketing order from best-performing of 4 econometric models with 42 weeks of data from 2/1985 to 5/1987; they later repeat the analysis with more data	7.5	--	Thompson and Lyon (1989:657 and 1991)
209B. Same as 209A; the <b>California-Arizona fresh navel orange</b> industry was cartelized by a mandatory USDA <b>marketing order</b> in 1934; study covers equilibrium prices in 1970s; competition raises prices to growers	An econometric simulation mode predicts prices for oranges with and without the marketing order for Valencia oranges in the 1970s	-20	--	Shepard (1986:118)
209C. Same as 209A	Same as above	-15	--	Shepard (1986:118)
210A. The <b>California-Arizona lemon marketing order</b> controls the US supply under a USDA mandate; in 1973 the policy was changed from one that emphasized constant prices to one that kept price constant; grower prices decreased and retail prices increased	An econometric model compares actual 1986-87 retail prices under the constant-price policy with the former consumer-friendly constant-quantity-policy yardstick	1.1	--	Carmen and Pick (1990:354)
210B. Same as 210A, but examines the effect of the new stabilization policy of returns to middlemen	Same as above, but calculates change in the marketing margin compared to the old policy yardstick	6.8	--	Carmen and Pick (1990:354)
211A. Two bid-rigging cartels in the <b>Upper Midwest U.S. road seal-coating construction</b> industry are detected from 1994-1998 data on almost 18,000 procurement contracts by private and public buyers; authors judge that prices in	A sophisticated econometric model incorporating Bayesian expert knowledge predicts cartel behavior on bids where the two largest firms are	8.0	--	Bajari and Yi (2003:Table 12)

the upper quintile of contracts (3500 contracts) were affected by one or more of two duopolistic cartels.	bidders; largest 20% of collusive markups are compared to the upper 20% of markups of competitive bids			
211B*. Same as 211A	Same as above, except cartel consists of the #1 and #3 firms	21.0	--	Bajari and Yi (2003:Table 12)
212A*. The legal <b>Norwegian cement cartel</b> was established in 1923; until 12/1968 (when it became a monopoly) it set market quotas based on capacity and exported through a common sales agency; without capacity constraints, the cartel over-invested in capacity and exported over-production at a loss; legal cartel	Using an innovative econometric model, the authors predict LR marginal cost during 1955-1968; mean domestic price in real 1985 NOK was 524.44 per tonne and MC was 417.37; peak year 1968	34.5	43.7	Röller and Steen (2006:332, Figure 4)
212B. Same as 212A	Divided predicted change in consumer surplus for 1955-1986 due to moving from Cournot to cartel conduct by total revenue (2.01%) and converted to mark-up	2.05	--	Röller and Steen (2006:336)
212C. Same as 212C	Prediction provided by Steen (2006) from Equation (5) using 1955-86 means; move from cartel to monopoly in 1968 increases the Lerner index by 39% two years later (1970)	8.35	--	Steen (2006), Röller and Steen (2006:336)
213A.. Survey report of the Japan FTC on several bid-rigging schemes involving large companies for 21 episodes of <b>construction of public projects and materials procurement by government</b> in Japan 4/1996-3/2003 (estimate 2000)	Price change if bids were not rigged; method compares actual bid prices to prices “after FTC crackdowns”	18.6	--	Kishi (2004), JFTC (2004:8); Jiji wire service 3/9/04
213B. Bid rigging of a tender made by Osaka, Japan city government for <b>germicidal chemicals</b> used in sewer systems; sometime during 4/1996-3/2003 (estimate 2000); may be one of those in 213A	Price decline on product after a raid by the JFTC	41.5	--	Kishi (2004), JFTC (2004:8); Jiji wire service 3/9/04
213C. Bid rigging of a tender made by Osaka, Japan city government for one <b>water purification plant</b> ; sometime during 4/1996-3/2003 (estimate 2000); may be one of those in 213A	Price decline on product after a raid by the JFTC	28.0	--	Kishi (2004), JFTC (2004:8); Jiji wire service 3/9/04
213D. Same as 213C	Price decline on product after a raid by the JFTC	28.8	--	Kishi (2004), JFTC (2004:8); Jiji wire service 3/9/04
213E. Same as 213C	Price decline on product after a raid by the JFTC	29.0	--	Kishi (2004), JFTC (2004:8); Jiji wire service 3/9/04
214. Survey report of the Japan FTC summarizing the average overcharges of 14 price-fixing cartels <b>manufacturing “basic materials”</b> (food, plastic, steel, chemicals, drugs, etc.) in Japan; spans unknown; convicted during April 1992 to March 2003	JFTC staff studies that compare average fixed prices to prices after the cartels were exposed; peak is for largest of 14 cases	12.1	25.0	Kishi (2004), JFTC (2004:7), Jiji wire service 3/9/04
215. In 1986 the <b>UK white salt duopoly</b> was found to have colluded in the 1974-1984 period at least, but the duopoly failed to achieve the monopoly level of prices and costs (costs 2 to	Rees proves overt collusion using an unusual method: comparing the predictions of noncooperative oligopoly price-	23-32	--	UK Monopolies commission (1986); Rees (1993:841)

5% above); see also #168 above.	leadership models with predictions from an infinitely repeated game model; Rees suggests a profit yardstick of 7 to 16% return on assets			
216A*. In the <b>Euro-Zone banks</b> case, the EC fined 5 German banks €100 million for fixing the commission for exchanging their customers' local-currency bank deposits into Euros, from 1/1/1999 to 12/11/2001; the cartel consisted of at least 25 German and Dutch banks, but 20 consented to lower their fixed fees or variable fees in 2000; there may have been coordination among hundreds of major EU banks; most eliminated all fees after 10/01	Author explains the basis of the EC's fine was to recover 90% of the banks' illegal profits; fixed commissions were 3.0% and but-for yardstick margin was 0.3%; thus, mark-up was 2.7 percentage points	800	--	Guersent (2004:23)
216B. Same as 216A, except 5 German banks agreed to fix their foreign exchange fees for the Deutsche mark at 3% during the Euro transition period 1/98-12/01	One of the original members of the cartel (Bayerische Landesbank) agreed to eliminate its fixed fee and reduce its variable fee to 2%	50+	--	EC (5/3/01 and 12/11/01), OJ (1/21/03)
216C. Same as 216A above; information from an EC consent decree involving Westdeutsche Landesbank of Germany	Percentage charge reduced from 3.5% to 1.5%	133	133	EC (5/14/01)
216D. Same as 216A, except EC consent decree with Bank J. Van Breda of NL	Fixed fee of €2.48 eliminated, but 1.25% fee retained; assumed that a typical exchange amount was €50-200	50-80	--	EC (5/14/01)
216E. Same as 216A; information from an EC consent decree with ING, Postbank, and ABN AMRO Bank of NL	Minimum fee lowered from fl. 7.5 to 3.5, but 2.75% charge unchanged; assumed typical amount exchanged is €50-200	20-38	--	EC (5/7/01)
216F. Same as 216A; information from an EC consent decree with Fortis Bank Nederland	Fixed service fee reduced from fl.5 to 2.5	100	100	EC (5/7/01)
216G. Same as 216A; information from EC consent decree with ING Bank Group in Belgium	Reduced their minimum fee from BEL 100 to 45, but fee of 2.25% unchanged; assumed typical amount exchanged is €50-200	17-35	--	EC (5/7/01)
216H. Same as 216A; information from EC consent decree with Ulster Bank of Ireland	Reduced its fee from 2.25% to 1% and eliminated a minimum fee of €2.5; assumed typical amount exchanged is €50-200	56-80	--	EC (5/3/01)
216I. Same as 216A; information from EC consent decree with Bayerische Landesbank of Germany	Abolished its minimum fee of €2 and reduced its service fee from 3% to 2%; assumed typical amount exchanged is €50-200	33-50	--	EC (5/3/01)
217*. <b>Chilean miners of sodium nitrate</b> , from the world's sole source of natural <i>caliche</i> deposits, formed a series of six voluntary export cartels from June 1884 to January 1914; each lasted an average of 3 years; exports grew 900% from 1880 to 1910; cartel set sales and export quotas for each mine and imposed penalties for violations but did not control entry; constant per ton export tax accounted for 30-70% of the export price .	When first formed, each cartel saw an increase in prices, followed by a slump when it was dissolved because of entry			Stocking and Watkins (1946: 120-127), Wallace and Edminster (1930: 26-56)

217A*. First Chilean export cartel of 1884-1886	Chilean f.a.s. export prices 1884-86 compared to 1883; peak is 1886	7.4	21.6	Stocking and Watkins (1946: 121-123)
217B*. Same as A; first Chilean export cartel of 1884-1886	Chilean f.a.s. export prices 1884-86 compared to 1887-1890; peak is 1886	30.1	47.3	Stocking and Watkins (1946: 121-123)
217C*. Second Chilean export cartel of 1891-1894	Chilean f.a.s. export prices 1891-94 compared to 1887-90; peak is 1894	4.8	7.8	Stocking and Watkins (1946: 121-123)
217D*. Same as C; second Chilean export cartel of 1891-1894	Chilean f.a.s. export prices 1891-94 compared to 1895; peak is 1894	7.7	10.8	Stocking and Watkins (1946: 121-123)
217E*. Third Chilean export cartel of 1896-1897	Chilean f.a.s. export prices 1896-97 compared to 1885; peak is 1896	0	3.4	Stocking and Watkins (1946: 121-123)
217F*. Same as E: third Chilean export cartel of 1896-1897	Chilean f.a.s. export prices 1896-97 compared to 1885; peak is 1898-1900	9.7	13.6	Stocking and Watkins (1946: 121-123)
217G*. Fourth Chilean export cartel of 1901-06	Chilean f.a.s. export prices 1901-06 compared to 1898-1900; peak is 1906	44.0	71.7	Stocking and Watkins (1946: 121-123)
217H*. Fifth Chilean export cartel of 1907-08	Chilean f.a.s. export prices 1907-08 compared to 1909-1910	18.2	26.2	Stocking and Watkins (1946: 121-123)
217I*. Sixth Chilean export cartel of 1913-July 1914; in July 1919 the Chilean Nitrate Producers' Assn. was formed with active government assistance (by 1925-26 with effective entry control tradable quota rights sold for 24% of the export price)	Chilean f.a.s. export prices in 1913 compared to 1909-1912	8.1	--	Stocking and Watkins (1946: 121-123, 128), Wallace and Edminster (1930: 48)
218*. The "east of Burma" agreement covered <b>flat rolled steel</b> products; began ca. 1985; still in operation 2003; steel mills in EU and Eastern Europe agreed to export only west of Burma; Japanese and Korean producers only east of Burma; fixed quotas annually and prices quarterly	Method not explained, but cites a 1993 OECD report by Alan William Wolff	25-30	--	Jenny (2003)
219*. <b>Roofing felt manufacturers</b> in Belgium fixed prices and shares from at least 1/1978 to 4/1984; 9 companies controlled 60% of market; fined by EC in 1986	EC Decision mentions several times that the cartel agreed to limit discounts to certain buying groups (the yardstick) while charging list to other customers	23-25+	--	EC (8/19/1986)
220A. <b>Flour procurement</b> collusion by the <b>Taiwan Flour Mills Association</b> , 32 member companies, from May 1997 to May 2000; fined by the Taiwan FTC in May 2000	Press release by Taiwan FTC estimates cost to consumers to be NT\$ 2 billion; method unknown	5.8	5.8	Taiwan Business News (5/5/2000), KFTC (2002)
220B. Same as 220A	Econometric model using 1994-1999Q1 quarterly data on 11 of the largest firms; overcharge derived from a conjectural elasticity and demand elasticity.	105	--	Ma (2005:18)
220C. Same as 220A	Econometric model using 1994-1999Q1 quarterly data on 11 of the largest firms; overcharge derived from a conjectural elasticity and demand elasticity.	49.3	--	Ma (2005a:166)

221. <b>Distributors of natural gas</b> in southern Taiwan (Pingtung-Kaohsiung and Tainan) fixed prices from 4/2000 to 1/2001 and were required to pay record fines by the Taiwan FTC	An analysis by the Taiwan FTC used the before price as a basis	175-300	--	China Post (1/12/2001), KFTC 2002)
222A. Bid rigging on <b>road construction</b> in Greeley, Colorado (the "Second 35 <sup>th</sup> Av. Project") around 1983	Autor's interpretation of bench-trial decision; damages from plaintiffs' econometric model accepted by judge	10.6	--	<i>State of Colorado v. Goodell Brothers</i> (1987)
222B. Same as 222A, except for "Third 35 Av. Project"	Same as above	8.7	--	<i>State of Colorado v. Goodell Brothers</i> (1987)
222C. Same as 222A, except from <i>Colorado ex rel. Woodard v. Goodell Bros.</i> and years 1978-1980; court found Goodell guilty of bid rigging on Colorado <b>road building projects</b> in 1978-1980	Reading of U.S. Appeals Court decision by Profs. Lande and Davis.	9.6	--	Lande and Davis (2007)
223. <b>Tetracycline</b> manufacturers in the US settled a civil damages case brought by 43 states, many cities, and indirect purchasers; a previous criminal trial conviction was overturned by an Appeals Court panel; conspiracy dates uncertain, probably Nov. 1953 to 1960	Defendants offer is based on an overcharge assumed to be 66.7% (method unknown), but "allowing for uncertainties in law and in fact" a compromise offer was made.	41	66.7	<i>W. Virginia v. Chas. Pfizer</i> (1970)
224. In a class action by US buyers of <b>polypropylene carpet</b> , a Daubert challenge results in a court decision to accept the opinion of one of the plaintiffs' experts	Econometric model predicts an overcharge for 1990-1995 for two types of carpets (rolls and cuts)	8.8	--	<i>In re Polypropylene Carpet Antitrust Litigation</i> (2000:32)
225. <b>UK copper smelters</b> , most in Swansea district of So. Wales, began rigging bids for purchased ore 1719-1726 and later rigged bids for export copper; first buyers' cartel of 4 smelters 1719-1726; second more formal agreement ("Associated Smelters") 1737-1779; Newell says second was "quite effective" at lowering ore prices and raising copper prices	No overcharges computed for the oligopsony phases of 1719-1779.			Read (1993), Newell (1998), Allen (1923)
225A. First episode: Cornish Metal Co., a sales-agency cartel, formed 1785 to buy all copper ore and set copper sales prices; controlled 2/3 by miners and 1/3 by smelters in Cornwall and later made side payments to Anglesea mines; collapsed in Oct. 1787 when stocks reached 2 years' supply, imports increased, and Anglesea defected.	Compares copper prices in 1787-88 with early 1785; peak is 1787	13.3	16	Allen (1923)
225B. Episode 2: Dec. 1787 to early 1792; more successful because a new common sales agency covered both Cornwall and Anglesea districts and total production quotas were observed	Large stocks of copper were eliminated 1788-1790 at prices 8% above 1785; peak is 1791	12.0	21	Allen (1923)
225C. Episode 3: First Copper Trade Association formed 1824; failed Dec. 1829 because no agreement on quotas and leading firms' shares dropped too far.	Author develops a price series on smelters' price-cost margins for 1824-29 and compares margins after collapse of cartel	25-30	--	Newell (1998:183)
225D. Episode 4: Second Copper Trade Assn. formed 1844 and kept secret until it ended 1867; more elaborate organization and higher degree of control of the industry (CR4 = 70%); copper prices constant during cartel, but ore	Author's figures on copper prices and ore prices 1844-1867 compared to 1842-43 prices; profit figures confirm effectiveness of cartel	19	--	Newell (1998:191)

prices forced down				
226. Associated Milk Producers was found guilty at trial of price-fixing, mostly in Southern US fluid milk markets from 1972 to 1980	Econometric model applied to 14 markets; dummy measures effect of DOJ consent decree; ave. is for all markets, peak for monopolized markets	4.5	5.3	Madhavan <i>et al.</i> (1984:161-69)
227. Price fixing and market-sharing of <b>cast iron and cast steel rolls</b> covered virtually all of W. Europe from Jan. 1968 to June 1980; many changes in pricing and organization during cartel; originally target prices for all Europe, later separate minimum price increases for each currency area; the Intl. Roll Manufacturers' Assn. (IRMA) was the collusive cover from May 1971; from 1971-77, bids from steel companies were handled through a Zurich office (ATAG); 30 companies and national associations fined by EU in 11/83	EC decision recounts many price increases by IRMA that were "quite efficient": from Jan. 1969 10% in 10/69, 40% by 10/70, 46% by 1/73, 55% by 1/74, and 100%+ by 10/74; but general inflation was significant in 1969-74, about 40-50%, so real price increases are calculated	40-60	--	EC (11/15/83: 5-9)
228A. The EU fined 40 firms from No. Am. and W. Eur. for price fixing in the European market for <b>bleached sulphate paper pulp sold in open markets</b> ; two episodes, 1/75-12/76 and 1/79 to 12/84; Decision gives quarterly transaction prices of bright (GE>80) prime bleached softwood pulp from 1/74 to 1982	Episode 1 (1975-76) average prices compared to 1974 (before) prices; peak same years	23	23	EC (3/26/85: para 15, 24, 113)
228B. Same as 228A	Same as above, except benchmark is 1977-78 after prices	25	25	EC (3/26/85: para 15, 24, 113)
228C. Same as 228A, except episode 2 (1979-81)	Episode 2 average prices compared to 1977-78; peak is 4/80 to 12/81	49.9	64.2	EC (3/26/85: para 15, 24, 113)
228D. Same as 228C	Same as above, except benchmark is price after collusion	20	31	EC (3/26/85: para 15, 24, 113)
229A. The Taiwan Fair Trade Commission fined 27 <b>distributors of liquefied petroleum natural gas (LPG)</b> in southern Taiwan of price fixing from April 2000 to Jan. 2001	The increase in a kg. of gas in Pingtung-Kaohsiung was from NT\$0.50 to \$1.00 (before) to \$2.00 during	100-300	--	TWFTC (1/12/2001), TFTC-OECD (2001:11-13)
229B. Same as 229A, except in Tainan	Price increase was from NT\$0.80 to \$1.00 (before) to \$2.00	100-150	--	TWFTC (1/12/2001)
230. The EC fined 5 French producers and a Taiwanese export trade Assn. for a Jan. 1973 agreement to raise prices on sales of <b>canned mushrooms in Germany</b> in Mar. 1973; in Dec. 1975, the cartel became ineffective because of a surge in Chinese imports.	Prices were raised in Germany Mar. and April 1973 from Jan-Feb. levels	10	--	EC (1/8/1975)
231. The EC disbanded and fined an association of four manufacturers of <b>wallpaper</b> in Belgium that had fixed f.o.b. and retail prices and all terms of sale from 1922 to 1974; perhaps the most detailed set of uniform rules of any trade association ever recorded	The association had complex rules for awarding discounts to wholesalers on the basis of annual purchases from the members; the most revealing yardstick for gauging price effect is the discount offered to all contractors and builders regardless of size	33.3	33.3	EC (7/23/1974: para.13)
232. The EC fined virtually every major PVC	Average transaction prices for	56	70	EC (12/21/1988:

manufacturer of <b>polyvinyl chloride plastic</b> for price fixing during 1980Q4 to 1983Q4; although overturned by the European Court, the price effects were not questioned.	three years compared to price several months before the cartel started			para. 17-19)
233A. A study of bid rigging in the commercial cartage ( <b>garbage collection</b> ) industry in NYC 1978-1985	Uses sales of customers among suppliers as a yardstick to compute the capitalized value of rents from overcharges	50	--	Reuter (1993:193)
233B. Same as 233A, except for residential customers in NJ and Long Island, NY	Same as above	15	--	Reuter (1993:193)
234. In <i>Webb v. Utah Tour Brokers Association</i> , 568 F. 2d 670 (1977) the court found a conspiracy from Feb. 1973 to about Dec. 1974 by <b>travel/tour brokers</b> in Utah to deny plaintiffs entry through boycotts	Reading of U.S. court decision	5	--	Appendix Table 4: entry 26 below
235A. In 3/1999 SAS Airlines (a DK-SW-NO joint venture) and Maersk Air informed the EC about a new code sharing agreement. After raids in June 2000, the EC determined (the " <b>Danish Air Routes</b> " case) that Maersk had agreed to withdrawal from the Copenhagen-Oslo and Copenhagen-Stockholm routes in return for Maersk's monopoly on the Billung-Copenhagen and Copenhagen-Venice routes plus monetary compensation; the agreement was effective from 3/99 to 4/01	The EC decision uncovered secret planning documents that showed that SAS would and did raise the fares on its route to Stockholm by DKK 100 to pay for the Maersk withdrawal; fares are about DKK2000-2500 on this route	4.75	--	EC (7/18/2001: para. 92-95)
235B. Same as 235A, except for the Copenhagen-Oslo route	Price increase of DKK 100 relative to fares of DKK 2100-2700	3.7-4.8	--	EC (7/18/2001: para. 92-95)
236A. A study of the <b>Swedish roundwood (timber) procurement</b> market in 1954-1984 found evidence of oligopsonistic pricing behavior by paper buyers in two interrelated sub markets: sawtimber and pulpwood [an EC-FI antitrust probe was launched in 2004]	A sophisticated econometric model simultaneously estimates the negative price effects on forestry firms for pulpwood in 1979-1984; peak is 1984	25	29.4	Brännlund (1989:702-703)
236B. Same as 236A	Same as above for sawtimber	10	11.8	Brännlund (1989:702-703)
237. The European Union fined 3 companies for price-fixing of <b>flat glass products in Benelux</b> ; 1978-1981	From internal documents of the cartel quoted in the EC decision (para. 14 and 41)	10-15	--	EC (8/8/84)
238A. The <b>German steel and iron</b> cartel of Mar. 1904 – June 1907 fixed prices of crude metal, rails, beams, rods, bars, sheets, axels, wheels, and castings; may be a successor to cartels #185-187 above; this refers to ingots.	Benchmark is 1895-1897 prices (the last normal demand period) of crude ingots	0	--	Walker (1906:860)
238B. Same as 238A, billets	Benchmark is 1895-1897 prices (the last normal demand period)	5.3	-	Walker (1906:860)
238C. Same as 238A, beams	Benchmark is 1895-1897 prices (the last normal demand period)	6.1-9.1	-	Walker (1906:860)
238D. Same as 238A, rails	Benchmark is 1895-1897 prices (the last normal demand period)	7.7	--	Walker (1906:860)
238E. Same as 238A, billets	Yardstick is f.o.b. Antwerp prices adjusted for transportation costs and subsidies	30	--	Walker (1906:864)
238F. Refers to <b>Thomas-Bessmermer pig iron</b> in the Ruhr market 1879-1913	Author compares market prices 1883-1913 with the "internal	10	--	Webb (1980: 311)

	price” (shadow or accounting price) yardstick of a major steel maker			
239. A U.S. Circuit Court convicted 16 companies for price fixing of <b>enameled iron bath tubs</b> from 6/1/1910 to 1/1/1911; one of the first cases of anticompetitive patent pooling	The decision quotes letters from the head of the Sanitary Enameled Ware Assn. complaining about cheaters undercutting the fixed price; peak price is from testimony of a nonmember of the cartel	15-17	45	Ripley (1916:614-616)
240. From 1982 to 1999, three companies colluded on <b>harbor loading services</b> in Taichung, Taiwan; fined by the TFTC	Based on yardstick prices for unloading scrap iron in two similar harbors	20-120	--	TWFTC-OECD (2001:14)
241. Bid rigging on a tender by National <b>Taiwan</b> University Hospital for <b>surgical suture thread</b> , by 3 Taiwanese, one U.S., and one German companies in August 1988	Yardstick is prices paid for same products by other Taiwan hospitals in 1997	50-80	--	TWFTC-OECD (2001:16)
242. The Taiwan Fair Trade Commission fined 15 <b>distributors of liquefied petroleum natural gas (LPG)</b> in Tamshui, Taiwan area of price fixing from May 1999 to May 2000	Before price NT\$400 raised to NT\$500 per cylinder	25	--	TWFTC-OECD (2001:18)
243A. The Taiwan FTC fined 5 <b>cable TV operators</b> for fixing the price of services from 1/1/2000 to 12/31/2000 in Kaohsiung City and County, Taiwan	TFTC calculated the monopoly profits of the 5 operators for 2000	30.5	30.5	TWFTC-OECD (2001:14,19)
243B Same as 243A	A TWFTC survey of cable prices in Jan. 1999 (weighted by subscribers, simple mean of 4 plans) compared to 1998; peak is annual fee	19.7	34.6	OECD (2006e:3)
243C Same as 243A, except for Neihu District of Taipei	A TWFTC survey of cable prices in Jan. 1999 (weighted by subscribers, simple mean of 4 plans) compared to 1998; peak is apartment building shared service	48.9	171.4	OECD (2006e:3)
243D. Same as 243A, except Keelung	No evidence of price increase from survey like 243A&B	0	0	OECD (2006e:3)
243E. Same as 243A, except Hinshu	No evidence of price increase from survey like 243A&B	0	0	OECD (2006e:3)
243F. Same as 243A, except Taichung	No evidence of price increase from survey like 243A&B	0	0	OECD (2006e:3)
243G. Same as 243A, except Fengshan District, Kaohshung County	No evidence of price increase from survey like 243A&B	0	0	OECD (2006e:3)
245. The Chinese Anti-Monopoly Bureau fined 5 business groups for rigging a bid in October 1998 to <b>construct a school building</b> in Changding County, Fujian Province, <b>China</b>	The Bureau calculated the illegal gains of the winner to be RNB 9000 on the RNB 263.574 project	3.4?		Wang (2001:9-10)
246. International <b>bromine</b> cartel of 1995-1998, 2 US and one Israeli company; two of them convicted by the US DOJ	Import price decline after the demise of the cartel	15	--	Yu (2003:10)
247. Three construction firms were fined by the Competition Council of France in 12/1994 for rigging bids for the <b>Normandy Bridge</b> project in the early 1990s	The Competition Council used as a yardstick an estimate of costs of construction prepared by an international committee of experts	40	40	Agence France Presse newswire (12/13/94)
248. Five <b>coffee</b> companies (2 German, 2 US, 1	In the second week of January	15	--	Euromarketing

Swiss) were fined \$3.5 million in 12/94 by the Hungarian Competition Council for fixing prices from 6/15/94 to 10/15/94	1995 in reaction to their fines, major coffee sellers dropped their prices 15%			1/10/95), OECD (1994-95:474-475)
249. Three makers and 7 managers of <b>electric pipes</b> were found guilty of illegal price fixing and fined by the Israel Antitrust Authority and found guilty by trial in 2002; dates of cartel unknown	Decision of an Israeli court reported by the IAA to the OECD (also in the IAA's 2003 annual report)	120	--	OECD (4/16/03: Israel 14), UNCTAD (2005:6)
250. The Korean FTC fined 11 <b>auto insurance</b> companies in 2001 for colluding from 11/99 to at least 8/00 on rate increases higher than the increases allowed in 2000 by the Financial Supervisory Service	Assuming that the Korean FSS based its allowed increases on changes in costs, the overcharge is the actual increase less the permitted increase	10	11.6	OECD (2001:Korea p. 11)
251A. Four manufacturers of <b>batteries for automobiles</b> were fined by the <b>Korean</b> FTC for price fixing from June 2003 to about Sept. 2004	KFTC report gives peak price change for large batteries May-Sept. 2004; for average, assumed equal price increases in 6/03, 1/04, and 5/04.	24.1	38.5	<i>KFTC News</i> (Dec. 2004)
251B. Same as 251A	Same as above, except for small batteries	20	31.9	<i>KFTC News</i> (Dec. 2004)
252. Three <b>beer manufacturers in Korea</b> were fined for price fixing from 2/1998-5/1999	Report of KFTC, using price before simultaneous price announcements	10	10	<i>Korea Herald</i> (5/29/99)
253. Three suppliers of <b>liquid propane gas (LPG) in Toluca, Mexico</b> were fined by the Mexican Federal Competition Commission in 1998 for fixing prices in 1996	Report of the CFC to the OECD decided that the price increase of 26.8% could not be justified by the 8% increase in LNG price	18.8	--	OECD (1998:2)
254A. In <i>Armco Steel Corp. v. North Dakota</i> , 376 F.2d 206 (U.S. App. 1967) the court found Armco guilty of fixing the price of <b>corrugated steel road drainage culverts</b> in ND from 1957 to June 1960	Reading of U.S. Appeals Court decision	18.5	--	Appendix Table 4: entry 2 below
254B. Same as 254A, except that plaintiff is Adams County, No. Dakota	Reading of U.S. Appeals Court decision	17.3-20.3	--	Appendix Table 4: entry 3 below
255. A series of <b>cordage (sisal and Manilla hemp ropes)</b> cartels were established among the major makers in the Eastern U.S. ports from Feb. 1861 to 1893. The 1 <sup>st</sup> episode (1861-July 1874), a loose "gentlemens' agreement" on prices, is probably the first recorded US industrial cartel.	No information on prices	--	--	Dewing (1913: 5)
255A. A series of informal agreements from 7/1874 to 12/1877 (2 <sup>nd</sup> episode) on price proved ineffectual.	Judgement of historian-author; no method cited.	0	0	Dewing (1913: 5)
255B. In Jan. 1878, a formal pool (an inventory of rope) was formed that assigned production quotas to each maker (from 0.25% to 11%); every month, members over quota sold to those under-quota at cost; ended Jan. 1881. Similar pools were reformed in 1882-84 and 1885-2/1888. (3 <sup>rd</sup> to 5 <sup>th</sup> episodes); pools controlled 70% of supply.	In early 1880, under-quota members paid 2 cents to buy from those over quota; price of hemp ropes ranged from 3.5 to 14.5 cents	75-625	--	Dewing (1913: 5-6:113)
255C. After a period of intense price competition due to cheating, the National Cordage Co. (6 <sup>th</sup> episode) was formed in July	Before NCC formed, price of hemp was 7.5 cents/lb.; avg. price 11/1887-1/1891 about 9 to	20-33	73	Dewing (1913: 6-16)

1887, initially with 4 members with 30% of market, but many rivals were bought out so by 1/1892 it had 90% of supply; a common sales agency was used; Paid cordage machinery makers to have exclusive purchase contracts, freezing out rivals; made high profits 1891-92; high prices attracted new entry; NCC developed huge unsold stocks in early 1893 and began to borrow heavily; entered bankruptcy 5/5/93.	10 cents; peak of 13 cents 4/1889			
255D. Same as 255C.	After collapse of NCC in mid 1893, price of hemp fell to 3 to 3.62 cents	149-233	259-433	U.S. Industrial Commission (1901)
256. In <i>FTC v. Superior Court Trial Lawyers Association</i> , 493 U.S. 411 (1990) the court found that association of <b>legal aid attorneys fixed their fees</b> , paid by District of Columbia to assist indigent defendants, 9/6/83-9/20/83	Reading of U.S. Appeals Court decision	16.7	75	Appendix Table 4: entry 5 below
257. In <i>Freeman v. San Diego Ass'n. of Retailers</i> , 322 F. 3d 1133 (2003) the court found a conspiracy to standardize <b>realtors' multiple-listing-service subscription charges</b> from 1992 to March 2003 in <b>San Diego, CA</b>	Reading of U.S. Appeals Court decision	--	150	Appendix Table 4: entry 6 below
258. In <i>Greenhaw v. Lubbock County Beverage Ass'n.</i> , 721 F. 2d 1019 (5 <sup>th</sup> Cir. 1983) the court found a conspiracy in Texas to fix <b>retail price of alcoholic beverages (liquor)</b> during the period June 1970 to December 1974	Reading of U.S. Appeals Court decision	7.7	--	Appendix Table 4: entry 7 below
259. In <i>Homewood Theatre v. Loew's</i> , 110 F. Supp. 398 (D. Minn. 1952) the court found a conspiracy in Minneapolis, MN from Jan. 1935 to Sept. 1948 involving <b>rental of first run movie films</b>	Reading of U.S. court decision	6.3	--	Appendix Table 4: entry 8 below
260A. In <i>New York v. Hendrickson Bros.</i> 840 F.2d 1065 (2d. Cir. 1988) the court found bid rigging on <b>NY state highway construction</b> contracts; first episode 1977 (and two other years below)	Reading of U.S. court decision	49.2	--	Appendix Table 4: entry 10 below
260B. Episode 2: 1978 contract	Reading of U.S. court decision	32.1	--	Appendix Table 4: entry 10 below
260C. Episode 3: contract	Reading of U.S. court decision	13.6	--	Appendix Table 4: entry 10 below
261. In <i>New York v. Cedar Park Concrete Corp.</i> , 85 Civ 1887 (2001) the court found bid rigging in the <b>NY concrete superstructure construction</b> industry during 1978-1985	Reading of U.S. court decision	5.9	--	Appendix Table 4: entry 11 below
262. In <i>North Texas Producers Ass'n v. Young</i> , 308 F. 2d. 235 (5 <sup>th</sup> Cir. 1962) the court found a conspiracy in Dallas, Texas from Nov. 1956 to Feb. 1961 to keep milk prices high by excluding a low cost <b>fluid milk processor</b>	Reading of U.S. court decision	36	--	Appendix Table 4: entry 12 below
263. In <i>Palmer v BRG of Georgia</i> , 498 U.S. 46,47 (1990) the court found naked division of the Georgia state market by two providers of <b>education services (Bar Review preparation courses)</b> , from 1980 to approximately Nov. 1990	Reading of U.S. court decision	167	--	Appendix Table 4: entry 14 below
264. In <i>Pease v. Jasper Wyman &amp; Son</i> , 2004	Reading of U.S. court decision	21.6	32.8	Appendix Table 4:

ME 29 (2004) the court found a conspiracy during August 1996 to October 1999 by four processors to suppress prices paid for <b>wild blueberries in Maine</b>				entry 15 below
265. In <i>Story Parchment Co. v Patterson Parchment Paper Co.</i> , 282 U.S. 555 (1931) the court found a conspiracy by three U.S. manufacturers to monopolize and destroy plaintiff's business by predatory pricing in the market for <b>vegetable parchment</b> from Nov. 1927 to at least the bankruptcy of Aug. 1928	Reading of U.S. court decision	27.7	--	Appendix Table 4: entry 16 below
266. In <i>Strobl v. N. Y. Mercantile Exchange</i> , 582 F. Supp. 770 (1984) the court found a conspiracy from about Jan. 1976 to May 1976 by two Idaho food processors to lower the price of a <b>Maine potato futures contract</b>	Reading of U.S. court decision	48.6	--	Appendix Table 4: entry 17 below
267. In <i>United States v. Dynalectric Co.</i> , 859 F.2d 1559 (11 <sup>th</sup> Cir. 1988) the court found a bid-rigging conspiracy on <b>electrical subcontracting</b> portion of building the Snapfinger Creek Wastewater Treatment Plant in Dekalb County, Georgia; bid made on September 7, 1979 and the final side payment to the loser was made on January 24, 1985	Reading of U.S. court decision	34	--	Appendix Table 4: entry 22 below
268. In <i>U. S. v. Foley</i> , 598 F. 2d 1323,1327 (C.A. Md., 1979) the court found that <b>real estate</b> companies in Montgomery County, MD agreed Sept. 5, 1975 to raise their <b>sales commissions</b> on houses; ended about April 1977	Reading of U.S. court decision	16.7	16.7	Appendix Table 4: entry 23 below
269A. In <i>Wall Products v. National Gypsum</i> , 357 F. Supp. 832 (N.D. Calif. 1973) the court found a U.S. conspiracy from December 15, 1965 until January 1, 1968 over price of <b>gypsum wallboard</b>	Reading of U.S. court decision	27	--	Appendix Table 4: entry 25 below
269B. Same as 269A, except an episode lasting from 1968 to 1973; the industry fixed prices solely through information-sharing; the FTC sued in 1973 and won on appeal to the Supreme Court in 1978.	A structural model of supply and demand; monthly prices and quantities fitted to the conspiracy period; author finds that the collusive model fits significantly better than Cournot and competition; implied Lerner Index is 0.4237	--	73.5	Sarkar (1996: 9-16)
270A. The <b>Japanese steel cartel</b> was formed by the major integrated steel manufacturers sometime before 1960 and continued to at least 2002; a precisely observed market-share agreement has been tolerated but not enforced by the Japanese government	Prices of Japanese domestic contracts on cold-rolled sheet steel 1993-1997 are compared to yardstick of contracts for same product in the U.S.	47	--	Tilton (2004:184)
270B. Same as 270A	Same as above for 1993-1997 prices of hot-rolled coil steel	19	--	Tilton (2004:184)
271. In the first of three U.S. trials ( <i>Pickett v. Tyson</i> ) under the Packers and Stockyards Act Tyson Foods was found liable by a jury for manipulating the purchase prices of <b>fed cattle</b> from Jan. 1994 to August 2002; on appeal in 2005	The jury was swayed by the plaintiffs' econometric evidence into awarding single damages of \$1.28 billion, which was 60% of the expert's prediction; peak effect in 2002	3	8.9	Taylor (2003: 20-21)

	Q1			
272. The international <b>polypropylene plastic</b> cartel fixed prices and market shares from June 1979 to December 1983; fined by EC	Price before (1977-early 1979) compared to EU transaction prices in DM given in decision	44.8	--	EC (Aug. 18, 1986:13-22)
273. With the advice of their foreign licensors, the four Japanese manufacturers of <b>heavy electrical equipment</b> formed a cartel in <b>Japan</b> in May 1931; became effective when two more joined in Dec. 1933; rigged bids to achieve agreed quotas; effective in certain more standardized product lines but not high-tech lines until about 1938-39	National price indexes for all heavy electrical equipment in 1933-1937 relative to base years 1930-32; peak year was 1937	34	50	Hasegawa (1994:252)
274. An international cartel in <b>compressed (industrial and medical) gasses</b> in the <b>Netherlands</b> from Nov. 1989 to Dec. 1997; fined by EU in 2002 and trade assn. cited; expanded from 3 (1989) to 5 (1990-91, 1995-97) to 7 (1994-95) firms over 4 episodes	Price changes set by cartel are adjusted downward by 2% per year for cost inflation for all 4 episodes	30-45	--	EC (7/24/2002: ¶112-154)
274A. 11/1989-11/1990 episode	Actual price change implemented Feb. 1990	5	5	EC (7/24/2002: ¶112)
274B. 11/90-12/92 episode	Actual price changes (2) implemented after Nov. 1990	15-18	15-18	EC (7/24/2002: ¶119)
274C. 12/93-10/95 episode	Actual price changes implemented 2/94 and 12/95	10.5	10.5	EC (7/24/2002: ¶129-137)
274D. 11/95-12/97 episode	Actual price changes implemented 1/96 and early 1997	10.5-16	10.5-16	EC (7/24/2002: ¶149-154)
275. Four to six <b>Chinese</b> manufacturers of <b>vitamin C</b> were alleged to have colluded on the price of <b>exports</b> to the US market; 2 episodes; a civil antitrust suit was filed in 2/2005; the six control over 68% of world supply in 2004-05				
275A. First episode began at a trade assn. (Chamber of Commerce of Medicines and Health Products Importers and Exporters) meeting 12/2001; six firms controlled about 70% of US imports in 2003; a price war began after July 2003 and ended October 2003.	US import prices were flat at \$3.40/kg. from 6/01 to 8/02; average price 8/03 to 10/03 was \$5.77/kg.; peak of \$6.80 reached on 5/03.	70	100	Isaacson (2008: slide 4)
275B. Second episode began at an “emergency meeting” of the trade assn. in Nov. 2003; four firms controlled 77% to 86% of US imports in 2004-05; prices rose for next 3 months, then fell slowly; collusion ended about 2/2005 but price effects lagged through all of 2005.	US import price reached \$3.40 in 12/05 after collusion ended; average price 11/04 to 12/05 was \$4.62/kg.; peak of \$6.05 reached on 2/04.	36	78	Isaacson (2008: slide 4)
275C. Same as 275B	US import price before 2001 meeting was \$2.80/kg.; reached average of \$4.57 in 2004; peak price in 2004 was \$6.05 in 2/04.	63	116	<i>SinoCast</i> (6/24/05)
276. Six Japanese firms fixed the prices of <b>aluminum foil</b> in Japan July 2002-Feb. 2005; JFTC raided firms on 2/8/05	Following a drop of 15% in 2001, prices were raised 5-10% in late 2002 and winter 2003-04	10-20	--	<i>Daily Yomiuri</i> (2/9/05:2)
277A. Three <b>cement</b> makers from France, Switzerland, and Germany were fined by the <b>Romanian</b> Antitrust authority for bid rigging and price fixing from 2000 to 2005	A statement of a spokesperson of the Authority asserted that prices rose from €20 to €50 during the collusive period	75	150	<i>AFX</i> (5/27/05)
277B. Same as 277A	Competition Authority spokesperson used prices in nearby	33-45	--	<i>AFX</i> (5/27/05)

	European countries as a yardstick			
278. Three manufacturers in Korea fixed the prices of <b>construction machinery (excavators and loaders)</b> from May 2001 to Nov. 2004	Estimate of the KFTC	3.5-9.2	--	Asia Pulse (4/6/05)
279. Three manufacturers in Korea fixed the prices of <b>forklift trucks</b> from Dec. 1999 to Nov. 2004	Estimate of the KFTC is 4% to 5% per year	20-25	--	Asia Pulse (4/6/05)
280. Collusion from June 2003 to May 2005 on <b>telephone fees for local land lines, Korea;</b> fined by the Korean FTC May 2005	Statement of the KFTC Director-General	15-20	--	<i>Asia Pulse</i> (9/15/2005)
281. Collusion from June 2003 to May 2005 on <b>connection fees for broadband internet service, Korea;</b> fined by the Korean FTC May 2005; one firm is US-UK owned	Statement of the KFTC Director-General	15-20	--	<i>Asia Pulse</i> (9/15/2005)
282. Collusion from June 2003 to May 2005 on <b>telephone fees for long-distance land lines, Korea;</b> fined by the Korean FTC May 2005	Statement of the KFTC Director-General	15-20	--	<i>Asia Pulse</i> (9/15/2005)
283. Collusion from June 2003 to May 2005 on <b>telephone fees for international land lines, Korea;</b> fined by the Korean FTC May 2005	Statement of the KFTC Director-General	15-20	--	<i>Asia Pulse</i> (9/15/2005)
284. The U.S. Supreme Court in 1921 ruled that the American <b>Hardwood</b> Manufacturers Assn. colluded through an information-sharing plan from Dec. 1918 to March 1921 among its 465 members, which represented 30% of output of the 9000 U.S. mills at the time; however, the price effects were sub-national in scope.	Alexander applies an econometric model to national prices in the US hardwood industry and finds no anticompetitive effect on output; thus, one can infer no price effect	0	0	Carlton and Perloff (2004: 383); Alexander (1988); Sjostrom (1991)
285A. The <b>Icelandic</b> Competition Authority in 2005 fined 3 <b>petroleum distribution</b> firms with the whole national market for price fixing 1993-2001; also bid-rigging against the government and fishing ships	Gross margins in the strongest collusive period 1997-2001 are compared to margins in a weaker collusive period (1993-1997) to calculate the cartel's gain	0.01-0.02	0.02	Samkeppniseftirlitid (9/23/2005: 22)
285B. Same as 285A	The Competition Authority report says that in 1998 Icelandic fishing vessels paid 50% less for fuel in the Faeroe Islands, Norway (a yardstick)	100	--	Samkeppniseftirlitid (9/23/2005: 16)
286A. Six multinational drug manufacturers fixed prices and rigged bids on <b>infant and baby formula in Italy</b> from about 1995 to March 2000; fined by the Italian Antitrust Authority in March 2000	Prices in Italy compared to yardstick of prices of identical items in pharmacies in neighboring European countries	100+	--	Italian Competition Authority (3/16/2000)
286B. Same as 286A except only 4 companies colluded from March 2000 to July 2004; companies also prevented sales to Italian supermarkets and blocked parallel imports from DE, FR, and ES; fined a larger amount a second time in October 2005	Prices of infant formula in Italy compared to yardstick of prices of identical items in pharmacies in neighboring European countries	150	300	Italian Competition Authority (10/20/2005)
286C. Same as 286B	Price reductions of infant formula in Italian pharmacies from July 2004 to October 2005	33	--	Italian Competition Authority (10/20/2005)
286D. Same as 286B	From an Italian Competition Authority survey of prices of baby formulas in Italy compared to yardstick of prices	100	200	Italian Competition Authority (10/20/2005)

	of identical items in pharmacies in neighboring European countries			
286E. Same as 286B	Price reductions of baby formulas in Italian pharmacies from July 2004 to October 2005	33	--	Italian Competition Authority (10/20/2005)
286F. Same as 286B	Survey of pharmacy prices of 9 brands infant formula for babies up to 4 months old in 7 large EU nations in 2002; simple average across brands in one country and then simple average of 7 countries; peak is UK	186	280	OECD(2006b:6-7)
286G. Same as 286B	Same as 286F, except survey in 2004; peak is UK comparison	193.3	335	OECD (2006b:6-7)
286H. Same as 286B	Same as 286F for formulas for infants over 4 months old; peak is UK	126.8	240	OECD (2006b:6-7)
286I. Same as 286B	Same as 286F for prices of formulas for infants with special medical conditions; peak is prices in Germany	101.9	142.5	OECD (2006b:6-7)
287. The <b>Europe-Asia Trades Agreement (EATA)</b> for <b>shipping</b> containers from northern Europe to East Asia had 18 members; it agreed to limit capacity by 31% in Nov. 1992- Dec. 1993 and kept the reduced capacity until disbanded in Sept. 1997; consent decree by the EC in April 1999	Compared to 1992, freight rates rose in 1993, 1994, and 1995 as a result of the capacity reductions in 1993	32.6	48	Drewery (1996: 110), EC (4/30/99: 33)
288A. Four tobacco processors in <b>Spain</b> began overtly colluding on the <i>maximum procurement</i> prices to pay 5000+ farmers represented by four unions for four types of their " <b>raw</b> " leaf tobacco in March 1996; was ineffective until punishment mechanism adopted in March 1998; failed to agree on prices in 2000-01; ended in Oct. 2001 when processors were raided by European Commission; 4 processors and 4 farmers' unions fined in 2003.	Ineffective episode 3/96- 2/98; prices to farmers actually declined an average of 162% from monopsony period 1993-1995 to marketing year 1997-98	0	0	EC (10/20/04: 13)
288B. Same as 288A, except for effective episode 2/1998-2/2000	Prices of Virginia grade in 1998-2000 compared to 1997-98; peak is 1999-2000	4.1	6.0	EC (10/20/04: 13)
288C. Same as 288B	Prices of Virginia grade in 1998-2000 compared to 2000-2001; peak is 1999-2000	8.4	10.2	EC (10/20/04: 13)
288D. Same as 288B	Prices of Burley E grade in 1998-2000 compared to 1997-98; peak is 1999-2000	4.8	6.0	EC (10/20/04: 13)
288E. Same as 288B	Prices of Burley E grade in 1998-2000 compared to 2000-2001; peak is 1999-2000	0.1	1.4	EC (10/20/04: 13)
288F. Same as 288B	Prices of Burley F grade in 1998-2000 compared to 1997-98; peak is 1999-2000	8.8	9.1	EC (10/20/04: 13)
288G. Same as 288B	Prices of Burley F grade in	0	0	EC (10/20/04: 13)

	1998-2000 compared to 2000-2001; peak is 1999-2000			
288H. Same as 288B	Prices of Havana grade in 1998-2000 compared to 1997-98; peak is 1999-2000	4.3	4.7	EC (10/20/04: 13)
288I. Same as 288B	Prices of Havana grade in 1998-2000 compared to 2000-2001; peak is 1999-2000	0.4	0.8	EC (10/20/04: 13)
289. The “Helsinki Agreement” signed by virtually all W. European national banking associations in May 1983 (effective 12/83) raised the maximum commission to be paid to a group of 703 French banks; also, for the first time a minimum rate was specified on <b>Eurocheque bank commissions</b> ; EU stopped the agreement and fined both groups in 3/92	The maximum percentage commission in 12/83 compared to the 1982 maximum	20-25	28	EC (3/25/92: 1-11)
290. The Society of Price-Regulating Organizations in the Building Trades ( <b>SRO</b> ), a federation of construction-industry trade associations, began allocating winners and rigging the prices of all <b>tenders</b> in all branches of the <b>construction industry of the Netherlands</b> in 4/1/87; some of its member associations began colluding as early as 10/1980; in 1982-88 the SRO rigged 25-30,000 bids per year; ended 2/92 with large EU fines on the SRO’s 28 members	The EC decision cites an independent study that calculates the increased annual costs of the SRO’s bid rigging at NGL400 million in 1987-88; sales of tendered construction projects in 1987-88 were NGL12.2 to 12.9 billion.	3.1-3.3	--	EC(2/5/92: 17)
291. At an <b>auction of rare books</b> held at Claygate Estate, Surrey, England over 10 days in October 1919, 81 book sellers formed a bidding ring for 447 of the 641 lots of 13,600 volumes sold; one of the dealers kept a detailed diary of the bidding ring published in 1990; bid rigging was made illegal in the UK in 1927	The ring met secretly later to hold 4 “knockout” auctions among themselves; prices advanced each time; total knockout sales (a yardstick) were £19,696, up from £3714 paid to the estate at the original auction	430	--	Porter (1992:434)
292A. Five manufacturers cartelized the global market for <b>DRAMs (dynamic random access memory semiconductors)</b> from April 1999 to June 2002; top 4 held 76% world share; U.S. guilty pleas made in 2004-07	In a DOJ plea agreement of May 11, 2005 with Hynix Semiconductor, the two parties agreed that the company’s affected sales was \$839 million, and (assuming the culpability multipliers were 2 to 4) that the U.S. overcharge was \$92.5 to \$185 million	12.4-24.8	--	<i>Korea Herald</i> (8/18/04); DOJ (5/11/2005) guilty plea [www.usdoj.gov/atrcases/f209200/209231.pdf]
292B. Same as 292A	Weekly data from iSuppli on prices of 128MB DRAM shows mean price \$2.88 from 12/01 to 6/02; prices before were \$1.50 to \$1.70; peak is 2/02.	69	147	WSJ (2/26/04:A1) quoting industry trade publication iSuppli (2004?)
292C. Same as 292A	Weekly data from iSuppli on prices of 128MB DRAM shows mean price \$2.88 from 12/01 to 6/02; prices after were \$1.50 to \$1.70; peak is 2/02.	69	147	WSJ (2/26/04:A1) quoting industry trade publication iSuppli (2004?)
292D. Same as 292A	From settlement in <i>DRAM Antitrust Litigation</i> , plaintiff’s expert’s econometric model	2.2-2.3	--	Lande and Davis (2007: Case 11), Connor (2007a)

	found damages of \$362-\$384 mil.			
293. Four manufacturers of <b>polychloroprene synthetic rubber</b> (a/k/a Neoprene) cartelized the global market from Sept. 1999 to April 2002; U.S. guilty pleas	In a public plea agreement of March 29, 2005 with DuPont Dow Elastomers, the two parties mutually agreed that the company's affected sales was \$410.5 million and its overcharge was \$42 million; latter probably an underestimate	11.4	--	DOJ (5/29/2005) [www.usdoj.gov/atrcases/f209200/209200.pdf]
294 A. The Aviation and Transportation Security Act of 2001 allowed Aloha Airlines and Hawaiian Airlines to obtain temporary antitrust immunity from 9/30/2002 to 10/1/2003 for their agreement to reduce passenger seat capacity on routes between Hawaii's major inter-island airports: prices on <b>Hawaiian air routes</b> rose immediately and a lagged price-adjustment effect until at least December 2004; U.S. average prices are shown to follow airfares in 6 other tourist destinations in Florida, Las Vegas, and Puerto Rico.	ATPI (Average Transportation Price Index) data for entire U.S. supplied by the U.S. Dept. of Transportation shows changes in Kona, Hawaii airfares from 2002Q4 to 2004Q4 compared to US ATPI yardstick in same period; peak price refers to 2003Q4	16.8	24.5	Blair <i>et al.</i> (2007: Figure 3 and Table5)
294 B. Same as 294A, except for Lihue, Hawaii	Average ATPI changes from 2002Q4 to 2004Q4 are compared to US ATPI price changes in same period; peak price refers to 2003Q3	15.8	21.6	Blair <i>et al.</i> (2007: Figure 3 and Table5)
294 C. Same as 294A, except for Kahului, Hawaii	Average ATPI changes from 2002Q4 to 2004Q4 are compared to US ATPI changes in same period; peak price refers to 2003Q4	12.7	18.6	Blair <i>et al.</i> (2007: Figure 3 and Table5)
294 D. Same as 294A, except for Honolulu, Hawaii	Average ATPI changes from 2002Q4 to 2004Q4 are compared to US ATPI changes in same period; peak price refers to 2004Q3	8.3	16.9	Blair <i>et al.</i> (2007: Figure 3 and Table5)
295. The <b>French semi-finished steel</b> cartel of 1932-1939 had 15 members; prices and domestic quotas were managed by the <i>Comptoir Sidurgique de France</i> (CSF); government encouragement but not participation; maximum market control of 52%	Price rise from 1936 to 1939 due to general inflation, labor policies, and devaluation of the franc; highly unstable quotas and inadequate penalties for cheating	0	0	Barbezat (1996: 529-530)
296. The <b>French structural-shapes steel</b> cartel of 1932-1939 had 15 members; prices and domestic quotas were managed by the <i>Comptoir Sidurgique de France</i> (CSF); government encouragement but not participation; maximum market control of 52%	Price rise from 1936 to 1939 due to general inflation, labor policies, and devaluation of the franc; highly unstable quotas and inadequate penalties for cheating	0	0	Barbezat (1996: 529-530)
297. The <b>French merchant-bars steel</b> cartel of 1932-1939 had 15 members; prices and domestic quotas were managed by the <i>Comptoir Sidurgique de France</i> (CSF); government encouragement but not participation; maximum market control of 52%	Price rise from 1936 to 1939 due to general inflation, labor policies, and devaluation of the franc; highly unstable quotas and inadequate penalties for cheating	0	0	Barbezat (1996: 529-530)
298. The <b>French thick plate steel</b> cartel of	Price rise from 1936 to 1939	0	0	Barbezat (1996: 529-

1932-1939 had 12 members; prices and domestic quotas were managed by the <i>Comptoir Sidurgique de France</i> (CSF); government encouragement but not participation; maximum market control of 52%	due to general inflation, labor policies, and devaluation of the franc; highly unstable quotas and inadequate penalties for cheating			530)
299. The <b>French thin sheet steel</b> cartel of 1932-1939 had 12 members; prices and domestic quotas were managed by the <i>Comptoir Sidurgique de France</i> (CSF); government encouragement but not participation; maximum market control of 52%	Price rise from 1936 to 1939 due to general inflation, labor policies, and devaluation of the franc; highly unstable quotas and inadequate penalties for cheating	0	0	Barbezat (1996: 529-530)
300 A. <b>Radium</b> was discovered in 1902; a Bohemian monopoly until about 1910 when U.S. mines were opened; from 1912 to 1923 a U.S. cartel dominated world supply (1 <sup>st</sup> episode ended in 1918)	Prices were held steady 1912-1918 at \$170,000 per gram [sic] when U.S. cost of production was \$70,000	243	243	Canada (1945: 36)
300B. In the early 1920s a Belgian Congo monopoly (Union Minière du Haut-Katanga) developed new radium supplies, causing U.S. cartel to drop its price during 1920-1923 (2 <sup>nd</sup> episode); “sometime in the mid 1920s” (ca. 1925), the U.S. producers stopped producing and became distributors for the Belgian firm, a world monopoly 1925-1931	Prices were held steady 1920-1923 at \$105,000 to \$120,000 per gram [sic] when U.S. cost of production was \$70,000	50-71	50-71	Canada (1945: 36)
300C. In 1931 a Canadian mine (Eldorado Gold Mining) discovered new, lower-cost radium supplies and prices fell until 1938 when a world market-sharing agreement was concluded (3 <sup>rd</sup> episode); 40% for Canada, 60% for Congo; for military security the Canadian mine was secretly nationalized in 1942, probably ending duopoly contract.	Price reached \$20,000 to \$25,000 per gram in 1938, but new international duopoly set 1938-1940 prices at \$25,000	0-25	0-25	Canada (1945: 36), Goldschmidt (2006:1)
301. Schering-Plough, a US drug maker, paid two other drug makers \$90 million if they agreed not to produce generic versions of a patented drug <b>K-Dur 20 (extended-release potassium chloride supplement)</b> from 6/98 to 9/01; the FTC ordered the practice to stop on 12/03, but lost on appeal when the Supreme Court refused to hear the case (after the Bush II DOJ intervened for the defendants!)	FTC Complaint states that overcharge is at least \$100 million and that patented drug sales are about \$220 mil. annually (which overstates sales had generics entered)	11.4	--	FTC(4/2/2001)
302. In 1928 the Canadian <b>Newsprint</b> Institute export cartel (legal in Canada at the time) was formed with the encouragement of the Premiers of Quebec and Ontario Provinces; members included all non-US newsprint <b>paper</b> companies with a national share of 70% of supply, of which 75% was exported to the US; subsequent Canadian cartel-formation efforts during 1934-1938 seem to have been equally unsuccessful.	Despite the role of governments, the Institute was able to raise prices on only one contract to the Hearst newspapers chain; by 1933 cheating and the Depression had caused prices to fall 24%	0	0	Canada (1945: 37-38)
303. Prices (corrected for the destination of exports) were collected for 83 <b>Swedish manufactured products</b> , some from industries that had export cartels in 1976-1990; if some of the same products from Swedish cartels with horizontal price agreements are cartelized in the	An econometric model regresses the ratio of Swedish prices to EEC prices against a dummy variable (=1 when the industry had a legally registered price-fixing cartel); thus,	0	0	Fölster and Peltzman (1997: Table 8.8, column 3).

EEC, then the price effects of Swedish cartels are biased toward zero	essentially a yardstick method			
304A. This study examines the price and output effects of 64 “ <b>rationalization and specialization</b> ” manufacturing cartels in <b>West Germany</b> during 1973-1986; they are legally exempted from German cartel prohibitions if consumers benefit from lower prices; most are in the non-electrical machinery, non-metallic mineral, food, and transportation equipment industries; the first sample consists of 33 cartels newly legalized	The cartels’ prices during the legal period are divided by the industry’s price 3 years before cartelization, then further divided by the same ratio for the industry group to which the cartel belongs, and finally a before/during difference calculated; a yardstick method	2.2	--	Audretsch (1989: 597)
304B. Same as 204A, except that the sample is 13 cartels that were unexempted during 1976-1983	Same as above, except that relative prices during the legal period are compared to relative changes 3 years after the exemption was nullified	4.5	--	Audretsch (1989: 597)
304C. Same as 204A, except that the sample is 18 cartels that were exempted throughout 1976-1983	Same method as 304A	3.3	--	Audretsch (1989: 597)
305. Six construction firms rigged bids on road projects (worth €83 million) and the price of <b>asphalt in the Seine-Maritime Department of France</b> from 1988 to the end of 1998; by 2005, the six had been acquired by three firms; France imposed fines of €33.6 million in 12/2005.	Studies commissioned by the Conseil found an overcharge to the Department of €24.8 million; method unknown	30	--	Conseil Concurrence, (12/15/2005:2)
306. Six <b>luxury hotels in Paris, France</b> (five foreign-owned) were fined by the Conseil Concurrence in 2005 for fixing prices as early as 1999 to 2003 through detailed information exchanges; price variation among the six five-star “palaces” was extremely low during these years	The <i>Decision</i> shows the ratio of 1999-2001 average prices of rooms at the six “palaces” compared to “Grand luxe” and “Hotels de charme” (1.88); the yardstick is the same ratio calculated for advance-purchase on 10/15/06 for four periods of 3 to 7 days in 11/06-1/07 at 10 four-star Paris hotels (the cheapest double room found on several travel search engines) (1.65)	13.9	37.2	Conseil Concurrence (2005:5,31)
307. Bid rigging in 4/1/2000 to 2/2/2001 by “dozes of firms” of government tenders for <b>construction of agricultural-engineering projects near Shinjo City, Yamagata Prefecture, Japan</b> ; Yamagata construction industry association involved; Prefecture officials alleged to have leaked the RCPs to bidders	An internal analysis by the Japan FTC compared the RCP (a yardstick, the buyer’s construction price from engineering estimates) during the collusive period with the RCP during 2/7/2001-12/31/2001.	5.4	--	OECD (2006:134)
308. Bid rigging by four manufacturers in 4/1/97 to 2/21/2001 of tenders by the District Transport Bureau of the Ministry of Land, Infrastructure and Transport of <b>Japan</b> for <b>Automobile testing machines and equipment</b>	An internal analysis by the Japan FTC compared the RCP (buyer’s estimated price) during the collusive period with the RCP during 2/23/2001-12/31/2001.	41.5	--	OECD (2006:134)
309A. Three <b>manufacturers of school uniforms in South Korea</b> were found guilty by the KFTC of price fixing and obstructing purchases of uniforms by parents’ buying	The KFTC calculated that the manufacturers’ prices increased 84 to 100% compared to the price before the cartel was	84-100	100	OECD (2006:140)

cooperatives from 11/98 to 5/01; overcharges were \$573 million; fines of \$8.8 million were imposed on the three manufacturers and colluding wholesalers and retailers	formed			
309B. Same as 307A	The KFTC compared cartel prices of winter-weight uniforms with prices after the fines	20.7	--	OECD (2006:140)
309C. Same as 307A	The KFTC compared prices of winter-weight uniforms made by non-members with prices after the fines	24.0	--	OECD (2006:140)
309D. Same as 307A	The KFTC compared cartel prices of summer-weight uniforms with prices after the fines	25.0	--	OECD (2006:140)
310A. In 1999 the <b>Korean</b> Omnibus Cartel Repeal Act eliminated the legality of <b>professional associations</b> to set fees for their members; prior to April 1981, Korea had no price-fixing law; the KFTC regularly surveyed those fees following deregulation in 2000, 2001 and 2002	Surveys found the fees of patent lawyers falling from 2000 to late 2001	11.4	--	OECD (2006:140)
310B. Same as 308A, except fees for all lawyers	Fees in 1999 compared to late 2001	12.0	--	OECD (2006:140-41)
310C. Same as 308A, except fees of auditing services	Fees in 1998 compared to late 2001	11.0	--	OECD (2006:141)
311A. In August 2003 the <b>UK</b> Office of Fair Trade fined a maker and 9 retailers of <b>football replica kits (shirts, shorts, and socks)</b> for price-fixing, a long-time practice formally made illegal in the UK since 1956; the infringement was both a vertical and horizontal restraint	An analysis for the UK Government by the Centre for Competition Policy, University of East Anglia compared prices of adult shirts in 2002 with Nov.-Dec. 2003 retail prices; peak is stores in Boston, UK	16.9	29.0	Davies (2004:73-84), OECD (2006:196)
311B. Same as 311A above	Same as above, except prices of junior-size shirts in 2002 with Nov.-Dec. 2003 retail prices; peak is stores in Norwich, UK	17.3	29.7	Davies (2004:73-84), OECD (2006:196)
311C. Same as 311A above	Price change after the cartel was exposed	43+	--	OECD (2005b: 20)
311D. Same as 311A	In response to a threat of a class-action damages suit, UK sports-clothing retailer JJB offered to compensate victims by giving away free a shirt with retail price £13.49 to all buyers of similar priced-fixed shirts (sold at £40-45)	43-51	--	<i>The Mirror</i> (2/10/07:21)
312A The Competition Commission of <b>Switzerland</b> found 4 <b>construction</b> firms guilty of bid-rigging on a March 1999 tender to <b>renovate</b> the façade of the <b>National Library</b>	The Commission invited an expert to estimate the competitive cost of the project, which was divided into the lowest collusive bid	112.4	112.4	OECD (2006a:3)
312B. Same as 312A	The Commission invited a 5 <sup>th</sup> firm to make a bid; this yardstick was divided into the lowest collusive bid	47.7	47.7	OECD (2006a:3)

313. Under the cover of the Taxi Service Providers Assn., a cartel with 39 participants was fined by the Lithuanian Antitrust Authority for fixing the prices charged by <b>call taxis in Vilnius</b> from 7/2004 to 12/2004	Prices rose by 33% on October 1, 2004 compared with the price a few months earlier	33.3	33.3	OECD (2006c:3)
314A. In Feb. 2004 the <b>Turkish</b> Antitrust Authority fined several <b>cement producers in the Aegean Region</b> for fixing prices during 2003-2004	The price of bagged cement in Izmir, the largest city in the Region, rose 165% faster than inflation in 2003-2004, and costs were constant	165	--	OECD (2006d:3)
314B. Same as 314A	The price of bagged cement in Izmir, the largest city in the Region, were 65% higher than the Ankara Region (yardstick) in 2003-2004	65	--	OECD (2006d:3)
315. The <b>Korean</b> FTC fined 4 manufacturers of <b>toilet paper</b> for price fixing from 1/1996 to 1/1998; after 1/96 the 4 charged identical prices; however, the Supreme Court overturned the finding of collusion from 1/96 to 7/97	Change in manufacturers' prices from 1996 to 1/98; peak is 12/97-1/98	18.3	21.1	OECD (2006h:6)
316. El Paso Corp. and Sempra (So. Calif. Natural Gas) settled 4 civil damages actions for \$1.6 billion for fixing the price of <b>natural gas sold by pipeline in California</b> from 9/1/1996 to 3/20/2003; El Paso was also convicted for self-dealing and price manipulation in No. Calif.	One illegal act by El Paso was purchasing pipeline capacity in 2/2000 for \$38.5 million that generated \$184 million in illegal profits (p.4 of Court Ruling)	378	378	Lande and Davis (2006:23-28)
317. Bristol Myers Squibb and Schein Pharmaceutical colluded to prevent entry into the US market for the anti-anxiety drug <b>bupirone</b> from 11/21/00 to April 2001; after being sued, the two firms settled damages to direct purchasers (\$220 mil.) and to indirectly overcharged consumers (\$93 million)	Probably by econometrics, plaintiff's expert estimated direct overcharges at \$232 million for the period 11/00 to 2006; sales of drug estimated to be \$2.2 billion	10.4	--	Lande and Davis (2006:10-14), Connor (2007a)
318. From May 1, 1998 to May 24, 1994, 37 <b>Nasdaq market makers</b> fixed the prices of <b>securities</b> , namely, the buy-sell spreads (i.e., the traders' fees); a class action representing 1.25 million plaintiffs recovered \$1.027 billion in damages in 1997-98; the SEC and DOJ imposed a consent decree in 1996	A law review analyzing the case quotes an academic affidavit affirming that the settlement was 100% of damages; the DOJ press release of 7/17/96 mentions affected sales of securities of about \$10 trillion (trader's fees are much smaller)	0.1	--	Lande and Davis (2006:45-47)
319. During 10/92-6/93, 7 manufacturers of <b>polypropylene carpets</b> fixed US prices; one firm was criminally fined by the DOJ, seven paid a civil settlement in 1998	The class-action Court decision (p. 1360) cites the plaintiffs' expert's study (probably econometric)	8.3	--	Lande and Davis (2006:64-66)
320. In 1992 a US federal government task force discovered a 22-year (1966-1988) bid-rigging scheme by 32 manufacturers and distributors of <b>specialty steel (stainless, nickel, and other alloys) piping</b> purchased by the Washington State Public Power Supply System and other utilities and refineries; the ringleader and his company were criminally prosecuted and convicted at trial in 1990; a 1988 class action with 6000 plaintiffs and 31 defendants	A decision of the 5 <sup>th</sup> Circuit Court of Appeals filed 5/28/92 affirmed the criminal convictions of 6 pipe distributors and cites the price effects as facts on p. 5	20	75	Lande and Davis (2006:94-96); 962 F.2nd 465

settled in 1992 for \$50 million.				
321. Collusion between Abbott Laboratories and Sandoz (a Novartis subsidiary) from 4/1/98 to 8/99 raised the price of the drug <b>terazosin hydrochloride (Hytrin brand)</b> and prevented the launch of competing generic equivalents; a class action was settled in Feb. 2005 for \$72.5 million	The Court decision approving the settlement filed 4/6/05 cites the plaintiffs' expert's calculation of damages (probably econometric) with approval on p. 15; sales from a newspaper article	43-63	--	Lande and Davis (2006:89-93); <i>WSJ</i> (2/7/00:B20); MDL 1317
322A. In 10/2004 the <b>Japan</b> FTC discovered 70 firms involved in bid rigging 180 contracts for <b>construction of public bridges</b> in 2003-04; 45 firms paid \$110 mil. in civil surcharges and 23 others paid \$55 mil. in criminal fines, both Japanese records; 8 men received prison sentences	The Tokyo High Court ruled that overcharges totaled \$78.9 million on projects costing the government \$634 mil.	14.2	--	<i>Daily Yomiuri</i> 11/11/06:2), <i>Jiji</i> 11/10/06), <i>AP</i> (11/10/06)
322B. Same as 322A	The ratio of winning bids to engineering estimates declined from 90% in 2003-04 to 60% after 2004	50	--	<i>Daily Yomiuri</i> 11/11/06:2)
323A. The first episode of the <b>Nord-Pas-de-Calais (NPC) coal</b> cartel in 16 Départments of northern France lasted from 1901 to 1919; 10 firms controlled 87% of the cartel's area of dominance	No information; historical study	--	--	Montant (2001:301)
323B. In 1922 a private NPC cartel was reformed but without an punishment mechanism (cheaters' identities were kept secret); 10 firms controlled 87% of the cartel's area of dominance; apparently price wars were frequent; external competition came from Belgium, Germany, and the UK	Judged ineffective	0	0	Montant (2001:301-303), Caron (1988), Sauvy and Hirsch (1984), Kemp (1972)
323C. The third episode began in 1927 when a recession caused the cartel to implement a 3-zone supply-control scheme with a more effective punishment mechanism; a 1932 agreement with the other two French coal cartels reinforced collusion; the NPC cartel lasted without price wars until government price controls were imposed in Aug. 1936	Judged "effective," but no numerical estimates	1	--	Montant (2001:303-306), Heaulme (1948)
324A. The <b>interwar UK coal</b> cartel operated from 1930 to 1939 with 17 production districts; organized by statute but operated by the mine owners; 1 <sup>st</sup> episode (prior to 1936) dumping across districts was common, each district set its own minimum prices, and quotas were exchanged among owners at a few pence per ton.	Judged to be ineffective during 1930-1935	0	0	Fine (1990:445); Kirby (1973:280), Marlio (1930:842)
324B. From 1936 to 1939 a national council allocated quotas to each district, eliminating dumping	Henley compares the mark-up on direct costs during 1936-39 with the mark-up before 1936	13-24	--	Henley (1988)
325. Five <b>airlines</b> raised the prices on the <b>Rio de Janeiro to Sao Paulo, Brazil</b> route in August 1999; ended sometime before Sept. 2004; fined 1% of their revenues by CADE, the Brazil antitrust authority	Simple before-and-during price comparison	10	10	UNCTAD (2005:4), OECD 2005c:22)
326. From 4/2001 to 11/2002 two <b>college bookstores</b> on the campus of <b>Indiana</b>	Plea Agreement states the profit margins rose from 25 to 27%	8	--	DOJ (5/10/04:3)

<b>University-Purdue University at Indianapolis (IUPUI)</b> fixed the prices of textbooks by eliminating discounts on books sold to students; One of the store managers was criminally convicted by the DOJ	during the conspiracy			
327A. Virtually all <b>cement</b> makers (100+) in <b>Egypt</b> fixed prices in 2002, affecting sales of \$630 million; indictments of 20 company officials by new Egyptian Competition Authority 1/08 and convicted in 2008	Price rise from 2001 (before cartel agreement in 2002)	37	40	Jenny (2005:16), <i>Financial Express</i> (7/5/07)
327B. Same as above, except cartels were fined illegal price fixing from 2002 to 2006.	From the decision of the court in Egypt's first antitrust trial of executives of 8 cartel participants; cost-based method for years 2003-04	20.9	--	Decision reported by <i>Daily News Egypt</i> (2008)
327C. Same as above, except cartels were fined for illegal price fixing from 2002 to 2006.	From the decision of the court in Egypt's first antitrust trial of executives of 8 cartel participants; cost-based method for 2006	17.5	--	Decision reported by <i>Daily News Egypt</i> (2008)
328. From July 2003 to Dec. 2005, 4 <b>asphalt paving contractors</b> rigged bids against Suffolk County and Brookhaven Town, New York; all four pleaded guilty and paid fines in 1/07	DOJ press release cites contract revenues and "restitution" (i.e., overcharge) amounts, price increase and selling price ranges	16.5	29	DOJ (12/22/2006)
329A. A large number of <b>cement producers in Turkey</b> colluded from 1993 to 2005, in three episodes; four investigations and two decisions to fine the cartel by the Turkish Competition Authority; first episode 1993-June 1999 when the first fine was imposed	Simple econometric model fitted to 1993-2005 data incorporates U.S. cement prices as a yardstick; year 2000 assumed to be competitive	24.6-33.6	--	Dalkir (2006:19 and 29), Dalkir (2007)
329B. Same as 329A	Econometric model above is corrected for mild autocorrelation	19.8-25.2	--	Dalkir (2007)
330A. A cartel composed of five multinational drug firms rigged one bid in Jan 2001 on a tender for <b>diabetes (blood glucose) testing reagent strips</b> by Coimbra Hospital in Portugal; fined by PT competition authority (PCA)	Five identical bids of €20 per package were submitted, which were increases on bids from the same firms for the identical product one year earlier	34-76	76	OECD (2005b: 24), PCA (1/11/05)
330B. Same as 330A, except the same cartel rigged 36 bids during 7/01-12/04 on tenders for <b>diabetes (blood glucose) testing reagent strips</b> by 22 hospitals in Portugal; fined a much higher amount by PCA	Mostly identical bids received by Hospital de Santa Maria in Lisbon, compared to early 2001 bids for the identical product	49-91	--	PCA (10/13/05)
331. The <b>Swedish asphalt paving</b> cartel of 11 Swedish, Finnish, and Norwegian companies rigged bids 1995-2002 on tenders by the National Road Administration (NRA) and several municipalities; the NRA was held complicit; fined by the national antitrust authority	A survey of road-services procurement officials found a significant drop in prices of asphalt paving following the end of the cartel	25	--	OECD (2005b: 24)
332. From 2000 to 2004, 10 <b>flour millers in Korea</b> fixed prices; 8 of the 10 were fined by the KFTC	Appears to be the peak increase from about 1999	--	40	<i>Yonhap</i> (3/3/06)
333. From 2001 to 2004 102 members of the <b>Portuguese Assn. of Shipping Agents</b> set	PCA decision reports "one case" (may not be typical) of a	--	2,024	PCA (2006)

“maximum” (i.e., target prices for <b>shipping-agent services</b> ; Assn. fined by PCA in 2005	price impact from 2001 to 2002 for “assistance to the crew outside port limits”			
334. In 1989 the house of a <b>Washington, DC</b> schoolteacher was sold at public <b>real estate auction</b> by her court-appointed conservator; a bid-rigging ring was later convicted for lowering the house price.	The designated winner of the bid paid \$22,000 for the house that was soon sold for \$36,500; market sale is a yardstick	39.7	--	Stucke (2006: 504), DOJ (1990)
335. Four companies were convicted and fined in <b>Norway</b> for fixing the prices of <b>corrugated cardboard paper</b> from 1983 to 1990; total affected sales was NOK 5.3 billion (\$842 million); decision sustained on appeal to the Supreme Court	The chief economist of the Competition Authority cites an expert opinion (used by the Court?) that the overcharge was NOK70 to 80 million and the deadweight loss 30-40 million; probably econometrics	8.3-9.5	--	Sølgard (2007:14-15), Sunnevåg (2007)
336A. As many as 40 insurance companies and insurance brokers in the US and UK conspired to rig bids on commercial <b>insurance brokers’ contingent fees</b> paid by buyers of insurance from 1/2001 to 10/2004; civil suits by many of the state attorneys general (initiated by New York) had obtained more than \$3 billion in restitution and civil penalties by early 2007; fees were 0.3% to 0.4% of the insurance premiums	Several settlements mentioned the agreed restitution (single damages) and the size of the companies contingent fees	2.9-6.1	--	AP (2006-07), <i>Insurance Business</i> (2006-07)
336B. Same as 336A	Same as above method for Prudential Ins. Co. settlement	27.5	--	AP (12/12/06)
336C. Same as 336A	One winner of a bid had a contract to pay a side payment to a loser of 10% to 15.75%; I assumed that the two divided these yardstick profits equally	20-31.5	--	New York State Attorney General (2006: 2)
336D. Same as 336A	Client A charged 19.6% more than target price (price with normal profits)	19.6	--	New York State Attorney General (2006: 5)
336E. Same as 336A	After bid rigging, Client B charged 111% more in 8/2002 than year before	111	--	New York State Attorney General (2006: 5-6)
336F. Same as 336A	After bid rigging, Client C charged 65% more in 10/2002 than year before	65	--	New York State Attorney General (2006: 7)
336G. Same as 336A	Client G charged 65% more than target price (price with normal profits) for insurance with more exclusions	20+	--	New York State Attorney General (2006: 8)
337. Three Korean and one US petroleum company were criminally convicted and fined for fixing the prices of <b>light oil products (Gasoline, diesel, kerosene) in Korea</b> , 4/1/2004 to 6/10/04;	The KFTC decision estimated customer damages at \$255 million on sales of \$1701 million	15.0	--	Yonhap (2/23/2007)
338. Four <b>ice cream manufacturers</b> were fined in <b>Korea</b> for price fixing from May 2005 to March 2007; the 4 controlled 80% of the Korean market	The KFTC decision calculated the increase on major items from 5/05 to early 2007	--	42.9	Yonhap (3/18/2007)
339. Two French <b>cement</b> manufacturers colluded on prices and entry with two local distributors and two wholesale trade	The decision of the Conseil de la Concurrence compared prices in Corsica with prices in	25	--	Conseil de Concurrence press release (3/12/07)

associations in the <b>Haut-Corse region of Corsica</b> from 1977 to 2007; all six entities were fined	the nearest Italian and Greek production areas			
340A. The authors surveyed a random sample of 495 lots at <b>auctions of basmati rice</b> during the Oct.-Nov.1999 season in <b>Panipat, Hariyana, India</b> . The auctions are oral ascending (English) bids managed by an auctioneer in a regulated market. There are many small farmers that sold lots to one large local miller and three large distant millers (CR4=55%) and to 5 to 10 additional small local millers; the 3 distant millers are represented by commission agents that (perversely) make larger fees when the large local miller withdraws from bidding on a lot and when the 3 collude on lowering the procurement price.	Controlling for quality (7 characteristics) and weeks, an econometric monopsony model of asymmetric overt collusion by bid rotation between the largest buyer and the next 3 buyers predicts the winning bid price best; numerical analysis is used to calculate the <i>undercharge</i> for the largest buyer when the other 3 large millers don't bid; peak is when only 6 buyers bid	7.1	8.4	Banerji and Meenakshi (2004b: Table 5)
340B. Same as 340A.	Same as 340A, except numerical analysis is used to calculate the undercharge for the the 2 <sup>nd</sup> , 3 <sup>rd</sup> , and 4th largest millers when the largest doesn't bid; peak is when 13 buyers bid	0.16	0.23	Banerji and Meenakshi (2004b: Table 5)
341. The authors surveyed a random sample of 421 lots at <b>auctions of wheat</b> during the April-May.1999 season in <b>Nerala, Punjab, India</b> . The auctions are oral ascending bids managed by an auctioneer in a regulated market. Many small farmers sold lots to one large local miller or two large distant millers (buyer CR4=45%) and to 6 to 13 additional small local millers; the authors compare winning prices in a bid-rotation model of overt collusion with a competitive model in which all 3 large buyers bid simultaneously.	Controlling for quality (4 characteristics) and weeks, an econometric asymmetric <i>monopsony</i> model of overt collusion by bid rotation among the 3 largest buyers; numerical analysis is used to calculate the undercharge when 2 of the 3 large millers don't bid; mean is when there are 9 or 10 small buyers bidding; peak is when only 7 buyers bid	2.2-2.9	3.25	Banerji and Meenakshi (2004a: Table 7)
342A. The French Conseil de la Concurrence fined six groups the maximum possible for bid rigging on 88 tenders for <b>construction of high schools in Ile-de-France</b> region during 1989-1996	The Decision gives several examples of increases in profit rates from the normal industry rate; for the school at Coulommieres, France	11-15	--	Conseil de la Concurrence (5/9/2007: 130)
342B. Same as A, except a high school at La Courneuvre, France	Same method (constant-profit-margin) as in 342A	11-14	--	Conseil de la Concurrence (5/9/2007: 130)
342C. Same as A, except a high school at Chatenay Malabry, France	Same method (constant-profit-margin) as in 342A	11-14	--	Conseil de la Concurrence (5/9/2007: 130)
342D. Same as A, except a high school at Sartrouville, France	Same method (constant-profit-margin) as in 342A	12-15	--	Conseil de la Concurrence (5/9/2007: 130)
343A. Four manufacturers of <b>acrylic glass (or polymethyl methacrylate/PMMA)</b> were fined by the EU for price fixing from 10/99 to 8/2005; in 2005 a U.S. class action alleged that the three largest of those four companies had fixed U.S. prices of both PMMA and the main input MMA from 1/1995 to 12/2003	The simple mean 1995-2002 EU transaction price of \$1.302 per kg. was divided by the 1993 and 1994 "before" prices; peak is 1995	17.3-26.4	79-93	Connor from Bizzari (2003: 41-43)

343B. Same as 343A, except for the U.S. domestic market	The simple mean US market price 1995-2003 was \$0.61 per lb., up from \$0.52-\$0.55 in 1993-94; peak year is 1997	17.3-19.6	29-40	Connor from Bizzari (2003: 30)
343C. Same as 343A, except refers to 1995-2002 US exports	Mean export price \$0.534 per lb., up from \$0.45-\$0.47 1993-94; peak is 1996	13.6-18.7	28-33	Connor from Bizzari (2003: 30)
344A. In early 1888 U.S. manufacturers formed a national <b>jute textile</b> cartel and immediately made side payments to 8 small members to cease production; despite a partially successful boycott by cotton farmers, prices remained high for two seasons (fall 1888 and fall 1889); prices fell 32% in 1889 because of new entry; by 1990 cartel members controlled only 52% of the market.	But-for price is average of Jan. 1886-June 1888	71.2	71.2	(Holmes 1994)
344B. Same as 344A.	But-for price is average of fall 1990 to fall 1992	76.1	76.1	(Holmes 1994)
345. Three+ airlines raised prices of <b>US-UK air cargo services</b> from 3/2002 to 2/14/2006 by colluding on fuel surcharges, which rose 1000%, much faster than fuel costs; US guilty pleas began in July 2007	From British Airway's fine, the minimum provable overcharge is \$200 mil. on sales of \$488.7 mil.	20.5+	--	DOJ (7/31/2007) guilty plea
346. Two+ airlines raised prices of <b>US-Korea air cargo services</b> from 1/1/2000 to 2/14/2006 by colluding on fuel surcharges, post 9/11 security surcharges, and the base rates; fuel surcharges alone rose 500%; US convictions began 8/2007.	From Korean Air's fine, the minimum provable overcharge on cargo and passenger sales is \$150; total sales are \$1214 mil.	12.4+	--	DOJ (8/31/2007) guilty plea
347A. Two+ airlines raised prices of <b>US-UK air passenger services</b> from 8/2004 to 2/14/2006 by colluding on fuel surcharges, post 9/11 security surcharges, and the base rates; US convictions began 8/2007.	From Korean Air's plea agreement, the fine of \$100 mil. is not based on the alternative sentencing provision, so no minimum overcharge can be inferred	10	--	DOJ (7/31/2007) guilty plea
347B. Same as 347A, but refers to fuel surcharge only	DOJ reports fuel surcharge rose from \$10/ticket to \$110 from 5/04 to 2/06 ; spot jet fuel prices rose from ca. \$41.40/bbl. in 3/04-4/04 to \$85/bbl. in late 2006; peak is early 2006	470	893	Antitrust Division (2008: 38), Factiva search
348A. Two+ airlines raised prices of <b>US-Korean air passenger services</b> from 8/2004 to 7/16/2006 by colluding on fuel surcharges;	From Korean Air's fine, the minimum provable overcharge on cargo and passenger sales is \$150; total sales are \$1214 mil.	12.4+	--	DOJ (8/31/2007) guilty plea
348B. Same as 347A, but refers to fuel surcharge only	DOJ reports fuel surcharge rose from \$0.10/kg. to \$0.60/kg. from 5/04 to 2/06 ; spot jet fuel prices rose from ca. \$29/bbl. in 2002 to \$85/bbl. in late 2006; peak is early 2006	50	300	Antitrust Division (2008: 38), Factiva search
349A. From 1/1994 to at least 7/1996, four Israeli <b>household liquid propane (LPG) gas distributors</b> controlling 92% of the market fixed prices; in 2004-2007 the companies and 15 executives were fined or imprisoned.	Estimate of post-restructuring price decreases made by the Israeli Finance Ministry	25	--	Wrobel (2007:17)
349B. Same as 349A	Estimate of post-restructuring	40-45	--	Wrobel (2007:17)

	price decreases made by the Federation of Israeli Chambers of Commerce			
350. The author studies several true private, hard-core <b>raw materials</b> cartels active in <b>Germany</b> in 1919-1931; products include anthracite coal, iron, steel, basic steel products, glass, and cement; all were protected by high tariffs	Author compares price indexes of protected cartelized raw materials for the years 1929-31 to a yardstick of unprotected raw materials sold primarily as exports; peak is 1931	30.1	52.5	Bloch (1932: Table 1)
351. A global cartel convicted by the EU in <b>isostatic graphite blocks</b> involved 9 firms from 7/1993 to 2/1998; meetings began in fall 1988.	The price in the EU in 1/1997 compared to the price in 1/1994.	--	52.7	EC (12/17/2002), Harrington (2007:91)
352. Alleged <b>Potash Export Cartel</b> based in <b>Saskatchewan, Canada</b> consisted of six mining firms with 100% of Canadian exports (and 50% of world supply) to the United States; began mid 1987 and ended 1993; sued by US s but case dismissed	Class action by US fertilizer makers. Author states that the 60 to 75% increase in prices in 1987-93 entirely explained by anti-dumping tariffs imposed by the US Intl. Trade Commission in 8/87	0	0	Scherer (2007: 4-5)
353. Collusive (i.e., significantly supra-Cournot) pricing conduct is inferred for the <b>Brazilian cement industry</b> in 1988-2000 from plant-level data: 57 plants owned by 12 firms operating in 17 states; mean local CR2=83%, CR4=97% and HHI=4494.	Econometric model finds 40% of all possible time-plant-pairs had competitive prices, 33% are 20% above Cournot, another 20% above 10%, and another 8% above zero; assume mean collusive price effects are 30%, 15%, and 5%, respectively	14.8-21.8	--	Salvo (2007: 28)
354. In 9/1996 33,000 travel agents and their counsel were paid \$86 million for allegations in <b>Airline Ticket Commission Antitrust Litigation</b> of collusion beginning 2/1995 by 7 U.S. airlines with 85% of industry sales; affected commission revenues were about \$7.98 billion	An industry analyst in CSFB Bank calculated that one airline saved \$25-\$35 mil. of \$510 mil. paid in commissions in 1997	4.9-6.9	--	<i>Houston Chronicle</i> (9/4/1996: 1D), Lande and Davis (2007: Case 1)
355. In <b>Lease Oil Antitrust Litigation</b> 31 large petroleum companies (some foreign) paid \$164 million for undercharging royalty recipients by depressing the price of crude oil from 1/1986 to 1993	Plaintiffs' expert's econometric model found damages of \$359 million; total royalties from <i>Statistical Abstract of US</i>	1.62	--	Lande and Davis (2007: Case 24), Connor (2007a)
356A. In <b>Microcrystalline cellulose Antitrust Litigation</b> US plaintiffs got a settlement from the 2 members of this 1984-95 global cartel	Plaintiffs' expert's econometric model for the Pharma class	22.1	--	Lande and Davis (2007: Case 20)
356B. Same as 356A	Plaintiffs' expert's econometric model for the food-processing class	18.5	--	Lande and Davis (2007: Case 20)
357. Covers <b>loan markets</b> in the <b>Honk Kong banking</b> sector 1991-2002	Econometric conjectural-variations model	0	0	Hong Kong Monetary Authority (2007)
358. Report of a decision of the <b>Pakistan Monopoly Control Authority</b> of a <b>cement cartel</b> of 16 local firms that raised prices from 10/16/98 to 2/9/99; the Ministry of Commerce intervened to cancel the restitution, allowing the cartel to continue until at least 7/2007	The Authority calculated the market overcharge of 4 billion rupees and the overcharge for each company for restitution using selling price before cartel	74	74	Mehmood (1999)
359A. The <b>Indian jute yarn and bag</b> industry, which dates from 1855, began restricting output as early as Feb. 1886 through late 1891 because	The cartel had cheating and internal dissention about how to handle the fringe producers; the	0	0	Gupta (2005)

of excess capacity. Excess capacity again developed in the early 1920s, reaching 30% by 1929, and prices fell 40% to 50% from 1925-29 to 1930-1931. The 18 members of the Indian Jute Manufacturers Assn., which controlled 90 to 97% of supply in the 1930s, reduced hours in 1930-31 by 33% compared with non-members. Fringe producers' share rose from 3% to 9%.	"doves" in the IJMA wanted to accommodate the fringe and avoid a price war; but industry output rose about 45% from 1931-32 season to 1936-37, much of it going to the fringe. Cartel ineffective in slowing price declines.			
359B. In 1933-37, the profits per loom for the "hawks" in the IJMA declined to 83% of 1929 levels and were half the levels of non-members. In March 1937, the output restrictions were lifted and prices fell to new lows in Dec. 1937-Feb. 1938. With the encouragement of the Bengal government later in 1938, the enlarged IJMA reimposed output limits in Jan. 1939	Prices in 1939 are compared to the 1937-38 price war year; the onset of WWII in 9/39 prevents an assessment of the cartel's long-term effects.	19	--	Gupta (2005)
360. In Feb. 2000, the <b>retail gasoline</b> stations in <b>Florianopolis, Brazil</b> , through their local owners' association, agreed to raise prices through 12/2000; companies and owners fined by CADE	An analysis of prices in the second half of 2000 by the Brazilian antitrust authority (CADE), compared to Jan. 2000 prices	20	20	Pfeiffer (2005: 3)
361A. In early August 1996, <b>Brazil's</b> three largest and dominant steel manufacturers agreed to raise their prices of <b>hot-rolled steel sheets</b> and announced their decision to the Ministry of Finance in advance; they were fined by CADE in 1999.	An analysis by CADE ruled out changes in costs; before-and-after	3.6-4.1	--	Pfeiffer (2005: 3)
361B. Same as above, but for <b>cold-rolled steel sheets</b>	An analysis by CADE ruled out changes in costs; before-and-after	4.3-4.5	--	Pfeiffer (2005: 3)
362. From 2005 to 2006, at least five US, UK, and German <b>manufacturers of toiletries</b> (liquid hand soap, shower gel, and toothpaste) in <b>Germany</b> colluded on the 2005-06 price increase; the firms and their sales executives were fined in 2/2008	An estimate of the German Federal Cartel Office developed from direct (internal historical records) evidence	5	5	BKT (2008)
363. Nine <b>cement</b> companies were found guilty of bid rigging in the <b>Jalalpur, India</b> market from 11/24/2000 to 1/19/2001	From the decision of the Indian Monopolies and Restrictive Trade Practices Commission, apparently the before price being used	20	56	<i>Indian Express</i> (March 3, 2008)
364. Four <b>pharmaceuticals distributors in South Africa</b> were accused of bid rigging against hospitals from 1998 to 2007; fines recommended to Tribunal	Report of the Competition Commission estimated price effects from 2001, during a brief non-collusive period	10-15	--	Barbeau (2008)
365. The Korean Fair Trade Commission imposed large fines on 3 <b>sugar refiners</b> with 100% of the national market for colluding 1991-9/2005	KFTC staff compared the increase in 2004-05 sugar prices with a yardstick of other comparable industrial goods	20	--	KFTC (2008: 58)
366. Restitution was paid by two of 13 <b>distributors of food in New York City</b> who rigged bids to supply schools in the NYC Board of Education from 5/1996 to 4/1999	Total restitution sought is over \$20 million on contracts worth over \$200 million	10	--	DOJ (8/9/2001)
367. <b>Procurement</b> of many goods and services by the <b>U.S. Defense Department</b> in 1960s	Author compares bid prices of identical products with several versus only one bidder (sole source contracts)	50	--	Yuspeh (1976)

368. Two firms out of 4 were convicted of bid rigging tenders in <b>construction of sewers in Klaipeda, Lithuania</b> in 2000 worth \$4.43 million;	Commission decision cites price increase based on yardstick of normal prices charged by two guilty parties and other rivals in market	22.3	22.3	OECD (2003a: 2)
369A. <b>River boat operators between Phnom Penh and Siem Reap, Cambodia</b> colluded on prices during ca. 2005.	Immediate increase in prices for Cambodian nationals from USD 5 to USD 10.	100	100	Bhatia (2006: 5).
369 B. Same as 369A	Immediate increase in prices for non-Cambodian nationals from USD 5 to USD 25.	400	400	Bhatia (2006: 5).
370. “Mylan Laboratories, Inc., the nation’s second largest generic drug manufacturer, and three other companies, were charged [in 12/98] ... by the Federal Trade Commission with restraint of trade, monopolization and conspiracy to monopolize the markets for two widely-prescribed <b>anti-anxiety drugs</b> , lorazepam and clorazepate.” Later convicted and required to disgorge profits. Span 1/98-12/98.	Report of FTC estimates average annual increase from 1997 in range of 1400% to 2200%.	1400-2200	3000	FTC (1998)
371. A knockout-auction bidding ring of 11 dealers from US, UK, France colluded against other buyers in <b>stamp auctions</b> from about 1980 to July 1997, mostly in New York City auction houses, but also in the UK.	A structural econometric model estimates true damages (less than half of “naïve damages,” i.e., side payments by winner) from data on 1781 lots auctioned during 6/1996-6/1997	3.4-4.2	--	Asker (2008: Tables 6 and 7)
372. Four manufacturers of <b>chocolate candy</b> are accused of fixing prices in the EU and North America from December 2002 to Dec. 2007. Prosecuted by Eur. Commission, Germany, and private plaintiffs in No. America	Plaintiffs allege effective price increases of 10% (12/02), 6% (12/04), and 5% (4/07) after 11/2002. <b>Enter this obs only if conviction occurs after 4/09.</b>	15.9	22.4	Duffy (2009: 1)
373. <b>Drug-gang cartel</b> , operated illegally in 12 square blocks (later 24 blocks) of a poor urban neighborhood of Chicago; had a strong local monopoly internally (30% of sales) and on sales to outsiders buying on bordering thoroughfares (70% of sales); created by violent enforcement methods; employed 500 to 690 persons, of which about 440 to 490 were full time; uniquely detailed internal records of drug-gang cartel; dates unknown, approx. 1992-96.				Levitt and Venkatesh (1998), Levitt and Venkatesh (2000)
373A. During peaceful pre-expansion phase (12 blocks of territory) when city-wide prices were relatively high	Mean mark-up over variable costs (cast-based method)	144	--	Levitt and Venkatesh (1998: Table 4)
373B. Same as 373A, except months of open warfare with a gang bordering to the North	Mean mark-up over variable costs (cast-based method)	-7.4	--	Levitt and Venkatesh (1998: Table 4)
373C. During peaceful post-expansion phase (24 blocks of territory): labor costs doubled and city-wide prices fell 40% from earlier period	Mean mark-up over variable costs (cast-based method)	27	--	Levitt and Venkatesh (1998: Table 4)
373D. Same as 373A, except post-expansion phase (24 blocks of territory) during months of open warfare with a gang bordering to the North, which ended with territorial expansion	Mean mark-up over variable costs (cast-based method)	28	--	Levitt and Venkatesh (1998: Table 4)
373E. Covers all 4 episodes (373 A, B, C, and D)	Regression analysis explaining variation in the monthly Lerner analysis; omits city-wide drug	88.7	--	Levitt and Venkatesh (1998: Table 6)

	prices; mean of all periods			
373F. Same as 373A, except 5 months before new territory was integrated; unclear, but may be period of open warfare with the drug gang bordering to the North	Regression analysis explaining variation in the monthly Lerner analysis; omits city-wide drug prices; effect on mean level of “transition” period	14.9	--	Levitt and Venkatesh (1998: Table 6)
373G. Same as 373 B.	Regression analysis explaining variation in the monthly Lerner analysis; omits city-wide drug prices; effect on mean level of “price war” periods	-4.8		Levitt and Venkatesh (1998: Table 6)
373H. Same as 373 E.	Regression analysis explaining variation in the monthly price of drugs sold; omits city-wide drug prices; mean price compared to “price war” periods	30.9		Levitt and Venkatesh (2000: Table V)
373I. Same as 373 E.	Regression analysis explaining variation in the monthly price of drugs sold; omits city-wide drug prices; mean price compared to “transition” or possible war period	22.7		Levitt and Venkatesh (2000: Table V)
374. The Italian antitrust authority fined 6 manufacturers (1 from US) and their “mandatory consortium” that <b>recycled batteries</b> to extract lead; collusion occurred 2002-07	Report of the authority compared 2002-04 prices of recycled lead in IT with yardstick of same prices in UK and DE	31.8	--	AGCM (2009)
375. <b>Lamp oil</b> (a/k/a Illumination oil or kerosene) began to be extracted from crude petroleum in the 1850s, eventually replacing whale oil; export prices were collected starting in 1879 and domestic prices from 1885; the Standard Oil Trust was formed in 1882; though formally “dissolved” in 1892 after the Sherman Act was passed in 1890, it was found guilty of monopolization in 1911.				Jenks (1900: 150-157)
375A. In 1896-97, the Standard Oil monopoly was challenged in New York City by the entry of Pure Oil Co., which built a more efficient plant than previous independents.	The decline in the NYC price of standard-grade illuminating oil in barrels fell from \$8-10 in 1895 to about \$6.50 in 1896-97; trough was \$5.50 in 12/1897.	19-35	31-45	Jenks (1900: 150-152 and chart)
375B. In 1899-1900, the price-cost margin between crude oil and refined oil in New York City “decidedly” increased from \$4 in 1896-97 to \$5 in 1899; the Trust increased its dividends 30% in each of the past 3 years; these trends are also seen in Chicago and Cincinnati.	Much of the increase in the gross margin in 1899 can be explained by the added costs of refining a broader range of products and by higher input costs, but higher profits seem to account for at least half of the margin increase since 1896-97; peak is Dec. 1899.	10	18.8	Jenks (1900: 153-155 and chart)
376A. The U.S. <b>tin plated steel</b> cartel (American Tin-Plate Co.), joined by all 6 to 8 major producers, began in January 1899 after a two-year period of declining profits (up to 50% by Oct. 1888); prices of imported tin plate remained about \$0.40 to 0.70 above the	The gross margin in the industry, using the price of “American coke tin plate” in Pittsburg rose to about \$1.15 to \$1.20 in 1899-1900, up from \$0.60-\$0.85 in June-Oct. 1898;	35-100	117	Jenks (1900: 157-164 and chart)

Pittsburg price to end of 1899.	peak in Mar. 1899.			
376B. Author shows that tin-plate-industry-cartel prices are by mark-ups over import price + tariff -- almost exactly -- as tariffs change; pricing began before cartel officially formed.	Compares actual NY wholesale prices/lb. 1891-99 of 14x20 tin plated sheets with pre-tariff import prices as yardstick; peak is 1884	52	81	U.S. Industrial Commission (1901: 557-59)
377A. In January 1899, the the Am. Steel and Wire Co. trust was formed, which controlled 65 to 95% of the US market for <b>barbed steel wire</b> . The gross margin increased from about \$1.00 in 1898 to \$1.50 to \$2.00 in 1899, in part because of the ownership of patents; peak was \$2.00 in Oct. 1899; ended 12/1899.	The price increased from about \$1.60 to \$1.70 in 1898 to \$2.50 to \$3.00 in 1899; peak was \$3.00 in Oct. 1899.	47-88	88	Jenks (1900:165-170 and chart)
377B. Same as 377A, except that 2 <sup>nd</sup> episode began when, in response to rapidly falling prices in early 1900 (about 25%), the Wire Trust closed several of its mills; producers outside the Trust followed with closures of their own; gross margins rose well above 1897-98 levels and remained high until mid 1915.	Prices of barbed wire stabilized in 4/1900, declining very slowly until the end of 1914; competitive bench mark is 1897-98 prices; peak is 1/1991-8/1902.	233	287	Jenks and Clark (1929: 119-122 and chart)
378. In January 1899, the the Am. Steel and Wire Co. trust was formed, which controlled 65 to 95% of the US market for <b>smooth steel wire</b> . The gross margin increased from about \$0.50 in 1898 to \$1.50 to \$2.00 in 1899; peak was \$2.00 in Oct. 1899.	The price increased from about \$1.12 in 1898 to \$2.00 to \$2.95 in 1899; peak was \$2.95 in Oct. 1899.	79-163	163	Jenks (1900:165-170 and chart)
379. A European centered global <b>borax</b> cartel was formed in 1878-79 and operated until Jan. 1899. Fitfull collusion occurred in the US from 1878; a US monopoly (Pacific Borax) was formed about 1888. Prior to 1894, U.S. producers had an understanding with the European cartels: a US monopoly for Pacific Borax and the rest of the world for the Europeans. In 1894, a US tariff reduction sparked aggressive warfare by Pacific Borax on the European cartel. In June 1896, a joint US-UK borax company was formed by Pacific Borax. The Europeans capitulated in Jan. 1899, selling all their assets to the Borax Consolidated Works trust (a UK company) of 12 companies, a global near monopoly that collapsed in 1913, but came out of bankruptcy as a public UK company. By 1980, U.S. Borax had become part of Rio Tinto Group.	To obtain a competitive price, one can chart changes in the delivered New York price of refined borax as the US import tariff varied from 5¢ (9/1890 to 8/27/1894), to 2¢ (8/28/1894 to 8/1997), to 5¢ (9/1897 to late 1999). After a few months of adjustment and near the end of these three periods, the US price settled down to 8.25¢, 5.25¢, and 7.25¢, respectively. Pacific Borax was known to mark up to the import price (the yardstick) plus the tariff. Thus, the competitive price ranged from 2.25¢ to 3.25¢ and was falling during the 1890s. Pierce and Holt also conclude that 2.25 to 3¢ is the competitive price.			U.S. Industrial Commission (1901: 567-570), Holt (1907: 223- 224), Pierce (1913: 63-65), Rothwell (1893-1921)
379A. For the period 9/1890 - 8/27/1894	Same as above; peak 10/1890	165-282	322	U.S. Industrial Commission (1901: 567-570), Rothwell (1893-1921)
379B. For the period 8/28/1894 -8/1897	Same as above; peak 9/1894	77-156	211	U.S. Industrial Commission (1901: 567-570), Rothwell (1893-1921)
379C. For the period 9/1897- 12/1899	Same as above; peak is 1999	115-211	222	U.S. Industrial Commission (1901:

				567-570), Rothwell (1893-1921)
380A. The U.S. <b>window glass</b> cartel began in 1880-1892 (1 <sup>st</sup> episode) as the Window Glass Manufacturers' Assn.; set prices, plant output, and wages; fell apart 1893-95	No prices available	--	--	U.S. Industrial Commission (1901: 564-566)
380B. Am. Glass Co. trust formed 1895; a selling pool for 85% of US production until Oct. 1999 when succeeded by Am. Window Glass Co.; pool made very high profits 1896-98; ended 1899; import duties 80-100% of import price.	Price of glass in 1893 relative to 1896-99	100	100	U.S. Industrial Commission (1901: 564-566)
381. Two South Korean manufacturers (one and affiliate of St. Gobain of France) of <b>flat glass</b> with 84% of the national market fixed prices from 11/2006 to 3/2009	KFTC decision uses before method	40-50	--	Yoon (2009)
382. Nine companies with with extensive, hidden cross-ownership colluded on <b>mobile telephone</b> service rates in <b>Indonesia</b> from 2003 to 2006; the Indonesian antitrust authority KPPU fined all 9 the maximum possible in November 2007.	The KPPU compared actual rates on purchases by consumers with a yardstick: average prices of the same services in nearby countries in Southeast Asia.	119-207	--	Jakarta Post (2007)
383. The <b>UK bleaching powder</b> industry was centered in Lancashire in the 19 <sup>th</sup> cent.; major input was mined salt, converted to chlorine with the LeBlanc process; exports to US were only source of bleach until 1897 when two US chemical firms (Dow Chemical and Mathieson Alkali) began production using a new low-cost electrolytic production method; two more US producers entered in 1906 and 1908.				Barker and Harris (1993), McCrosty (1907), Levenstein (1995: 595-601)
383A. In response to falling prices, Lancashire Bleaching Powder Manufacturers' Assn. formed in 1883, dissolved in Dec. 1889; aggressively bought or drove entrants out of business.	Prices rose to £7 per ton in 1884 from £3 7s. 6d. in 1883	--	107	Barker and Harris (1993: 440-444)
383B. In Feb. 1891 UK manufacturers merged to form the United Alkali (predecessor of ICI) cartel; cartel ceased to be effective around 1897-98	Prices rose during October from £5 to £6 per ton	20	20	McCrosty (1907: 187-188)
383C. Same as 383B	In 1898, German producers adopted the electrolytic method and exported to UK; prices fell from £6.35 in 1897 to £4 in 1903-05	59	--	McCrosty (1907: 192)
383D. In late 1899 or early 1900 a new unnamed syndicate was formed that lasted until at least 1905; colluded with German cartel on exports to US (possibly combining German manufacture with UK cartel's US distributors)	Prices in late 1900 to 1902, compared to 1898-99 when no cartels existed	26	--	McCrosty (1907: 141-143), Levenstein (1995: 597-98)
383E. Same as 383D	US prices declined from \$1.75 in 1901 to \$1.50 in 1911	17	--	Levenstein (1995: 595 fn. 67)
384. When the Lancashire <b>bleaching powder</b> cartel operated (1883-1889), a <b>US</b> distribution monopoly was given to New York's James Lee & Co.	The US price in 1881 was \$1.07/cwt., but rose to \$2.25 in 1891	111	--	Levenstein (1995: 595 fn. 67)
385A. Three manufactures of the chemical intermediate <b>MCAA</b> (monochloroacetic acid)	After constant 1984-89 prices, there was a decline in EU prices	15.2	18.1	EC Decision (1/19/2005: §2.3.3)

held a 53-55% global share (and 90%+ EU share) operated several episodes of a global cartel from the late 1970s to May 1999; this episode in EU began about Jan. 1984, ended Dec. 1992.	in 1/91-12/92 (1993 after price) due to a new plant opening; peak is 1984-89.			
385B. Same as 385A, except a 4 <sup>th</sup> company joined the EU cartel and the cartel began improved monitoring of sales data; episode is 1/1994-5/1999	There was a low price in EU in 1993 (before price) due to a new plant opening; peak is 1997	15.6	21.2	EC Decision (1/19/2005: §2.3.3)
386A. From 4/1994 to 10/2002, 8 refiners (100% of market) and 6 large road construction builders (45% of mkt.) colluded on the <b>Dutch bitumen</b> market; fined by EC 9/2006.	Difference in rebates for largest builders and for fringe builders during 4/2000-7/2001; peak is 3/01-4/01	8.6	12.3	EC(9/13/2006: 42-45)
386B. Same as 386A	NL prices of bitumen compared to yardstick of BE, DE, and FR prices 4/2000-10/2002; peak is 7/01-10/01	27.2	28.2	EC(9/13/2006: 42-45)
387. Two card-issuing consortia of banks, <b>Visa and Mastercard</b> , bank associations with 6000+ members, were successfully sued in US court for colluding on the size of transactions fees charged to retail merchants; the 2004 settlement of \$3.05 billion in compensation (and \$25 billion in injunctive relief) was the largest in antitrust history; dates are 1980? – 2002?	Statement of the judge that interchange fees were reduced by about one-third.	50	50	US District Court in Brooklyn, NY decisions (2003-04)
388. The seven manufacturers who held rights to the 1894 patent that started the <b>calcium carbide</b> industry formed a cartel in early 1910, after the patent expired; they signed agreements with new entrants in other countries of Europe to create a French market hegemony; after a brief price war in 2/1914, an 8 <sup>th</sup> manufacturer joined; in Dec. 1915, the government introduced price controls ending the cartel	In 1910, prices rose from 250 to 290 francs, where they held steady through 1914	16	16	Paxton (1992:156-157)
<p>a) If the dates of the cartel's effective period of operation are different from its formal existence, the former dates are given if known.</p> <p>b) If a source states that an episode was "unsuccessful" (or similar term), the overcharge is zero; if the descriptor is "weak," then an arbitrary value of 1 is coded.</p> <p>c) Except for the most recent additions after 2004, a complete list of references can be found in Connor (2004) [<a href="http://www.antitrustinstitute.org/recent2/355.cfm">http://www.antitrustinstitute.org/recent2/355.cfm</a>]. In addition, the <i>Wall Street Journal (WST)</i>, <i>New York Times (NYT)</i>, <i>Financial Times</i>, and other newspapers or news wires (<i>AP</i>, <i>APX</i>, <i>Jiji</i>, <i>Yonhap</i>, <i>Asia Pulse</i>, etc.) are cited as sources for legal decisions.</p> <p>d) The first number is from the first edition of Posner, the second from the second (2001) edition.</p> <p>Note: Occasionally, a source gives a percentage decline (P%) in prices from during to after a cartel episode; in these cases the overcharge should be converted to using the formula <math>P\%/(1-P\%)</math>. Similarly, Lerner Indexes (margins) of market power are converted to overcharges (percentage mark-ups).</p>				

Appendix Table 3. Average Overcharge Observations, by Year and Type

Episode Number <sup>a</sup>	Source	Reasons for Concern
23	Bittlingmayer (1982)	Analysis contradicted by Williams (1986), Taylor (2002)
74A	Gallet (1997)	Study cannot distinguish overt from tacit collusion.
74A	Baker (1989)	Refers to US data, whereas case is a European cartel
74B	Barbezat (1989)	Covers a period in which cartel was government-directed
84	Jeon and Shin (2005)	Regression analysis assumes that Korean steel production affected global demand and the Korean import price; annual data used when quarterly preferred.
None	Sproul (1993)	BLS data employed are inappropriate (see Werden 2003)
None	Block <i>et al.</i> (1981)	Settlements in the bread industry are a poor guide to overcharges, and dividing them by 3 worsens the problem
37	Newmark (1988)	Ten other economists have cited the FTC analysis of prices with approval; moreover, an Appeals court upheld the conviction; and Mueller and Parker (1992) provide a devastating critique of Newmark's article.
None	Pesendorfer (2000)	Author would not supply data necessary for calculation.
190	Wiggins and Libecap (1987)	Repeated assertions by authors that cartel was ineffective are not supported by (an entirely feasible) quantitative analysis.
9	Scott (2000)	A critique of Lanzilloti (1996), who appears to defend ably his original conclusions in his 2000 rejoinder.
284	Sjostrom (1991)	Finds no evidence of national collusion in the <i>Hardwood</i> decision of 1921, but most authorities have agreed on this point for some time.
207,208,209,210		These USDA Marketing Orders are formed voluntarily by votes of their farmer-members, but once approved all producers must conform to the quality and timing restrictions imposed by the Order's administrators.

- 155 Kinghorn and Nielson (2004) Find that the prices of the German coal and iron and steel cartels were below the yardstick prices in the UK; however, one of their major sources (Webb 1980) shows that during the cartel periods productivity change was higher in Germany than in the UK.
- 284 Alexander (1988) An interesting study, but the Hardwood Association did not engage in explicit price fixing on a national basis.
- None Hendricks and Porter (1988) The authors find that federal government auctions of oil “drainage leases” on tracts on the Outer Continental Shelf return 14.3% lower prices per acre than “wildcat tracts”; they attribute the difference to collusion, but not necessarily explicit collusion.

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<sup>a</sup> “None” means that this study is the only one about a potential cartel market; therefore, no cartel observation was created in Appendix Tables 1 or 2.

Appendix Table 4. Final Court Decisions with Overcharges Data

Name and Type of Case	Overcharge	
	Average	Peak
1. Addyston Pipe & Steel Co. v. U. S., 175 U.S. 211 (1899) (conspiracy to allocate customers via secret bidding pool)(Court provided a typical result, but not an average figure <sup>1</sup> )	34.7-42.6%+	
2. Armco Steel Corp. v. North Dakota, 376 F.2d 206 (U.S. App. 1967) (highway construction bidding conspiracy. <sup>2</sup> ) (period of injury involved was from 1957 to June 17, 1960)	18.5%	
3. Armco Steel Corp. v. Adams County, 376F. 2d 212 (1967)(highway construction bidding conspiracy) (same defendants as previous case but different victims) (corrugated culverts for local road-work purposes during the years 1957-1960)	17.3-20.3%	
4. Colorado ex rel. Woodard v. Goodell Bros., 1987-1 Trade Cas. (CCH) P67,476 <sup>3</sup> (road building projects bid in 1978 and 1980)	9.6%	
5. FTC v. Superior Court Trial Lawyers Association, 493 U.S. 411 (1990) (legal aid attorneys conspired to raise fees <sup>4</sup> ) (began September 6, 1983 and ended Sept. 20, 1983)	16.7% <sup>5</sup>	75%

<sup>1</sup> "The cost of producing pipe at Chattanooga, together with a reasonable profit, did not exceed \$ 15 a ton. It could have been delivered at Atlanta at \$ 17 to \$ 18 a ton, and yet the lowest price which that foundry was permitted by the rules of the association to bid was \$ 24.25. The same thing was true all through 'pay' territory to a greater or less degree, and especially at 'reserved' cities."

This means that the typical price increase was at least  $\$24.25 - 18 = 6.25/18 = 34.7\%$  And,  $24.25 - 17 = 7.25/17 = 42.6\%$

<sup>2</sup> "We have no difficulty whatever in holding that there was adequate basis... proximate injury in the amount of \$258,355, on the extent of the artificiality involved in the fixed prices and its ingrediency in the \$1,396,500 list-price aggregate ... which had entered into the construction projects let during the conspiracy period, and in the \$2,000 quantity of direct purchases made by the State." If \$258,355 of the \$1,396,500 was an overcharge, then the overcharge would have been 22.7% of the base figure of \$1,138,145.

<sup>3</sup> The court found that plaintiff has reliably proved the overcharges on two of the three contracts at issue; competitive prices of \$333,253 and \$343,051 were increases by \$35,381 and \$29,732. Colorado ex rel. Woodard v. Goodell Bros., 1987-1 Trade Cas. (CCH) P67,476 Id at 7.

<sup>4</sup> Legal aid attorney conspired to raise fees. Cartel/boycott by Washington DC lawyers (public defenders) that demanded (& received) a price increase from \$30 hr court time and \$20 hr non court time to \$35 hr for both in the span of a week. They would later seek and obtain a price increase to \$55 hr court time & \$45 hr non court time (without a boycott).

6. Freeman v. San Diego Ass'n. of Retailers, 322 F. 3d 1133 (2003)(conspiracy to standardize subscription charges <sup>6</sup> ) (from 1992 to March 2003)		150%
7. Greenhaw v. Lubbock County Beverage Ass'n., 721 F. 2d 1019 (5 <sup>th</sup> Cir. 1983)(conspiracy to fix retail price of liquor for 4 ½ years <sup>7</sup> ) (during the period June, 1970 to December, 1974)	7.74%	
8. Homewood Theatre v. Loew's, 110 F. Supp. 398 (D. Minn. 1952) (conspiracy in Minneapolis, MN from Jan. 1935 to Sept. 1948 involving first run films <sup>8</sup> )	6.3%	
9. Kruman v. Christies' Intern. PLC, 284 F. 3d 384, 390 (C.A. 2 2002) <sup>9</sup> (global fine art auction cartel 1992-2000)	50 %	150%
10. New York v. Hendrickson Bros. 840 F.2d 1065 (2d. Cir. 1988 <sup>10</sup> ) (bid rigging on state highway construction contracts - three distinct episodes in 1977, 1978, and 1979)	49.2% 32.1% 13.6%	

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<sup>5</sup> The increase was 16.7% for in court time and 75% for out of court time, but it was not possible to compute the average.

<sup>6</sup> Group of realtor associations combined and standardized their charges. Some raised subscription price from \$10 up to \$25, others lowered them. Although it was not a simple price fixing conspiracy, Judge Kozinski called it "price fixing". However, since he did not state how much the average charge increased, we did not include it in our median or average estimates.

<sup>7</sup> Jury decided amount of overcharge and appellate court upheld. Id at 1026-27.

<sup>8</sup> \$39,432.67 loss on sales of \$625,763.78.

<sup>9</sup> "On November 2, 1992, Sotheby's announced it would increase its buyer's premiums from 10% to 15% for the first \$ 50,000.00 of the purchase price. On December 22, 1992, Christie's declared an identical increase in its buyer's premiums. The defendants allegedly agreed not to reduce these premiums. The defendants also agreed to set their seller's commissions at identical levels. Prior to March 1995, the defendants would permit clients to negotiate smaller seller's commissions. On or about March 10, 1995, Christie's announced it would implement a fixed schedule of non-negotiable seller's commissions ranging between 2% and 10% depending on the value of the item to be sold. On April 13, 1995, Sotheby's stated it would implement a fixed schedule of non-negotiable seller's commissions substantially identical to the schedule set by Christie's." Id at 390.

For the items covered by the agreement, buyers' commissions rose by 50%, from 10% to 15%. In addition, the new sellers' commissions means that total commissions had increased from 10% up to as much as 25% - a 150% increase.

<sup>10</sup> Jury determined that contract overcharges were \$590,000 on what should have been a \$1.2 million contract (49.2%: page 1070), \$644,000 on what should have been a \$2,004,000 contract (32.1%: page 1071-72), and \$1,113,000 on what should have been a \$8,187,000 contract (13.6%). The Court also noted: "Amfar was advised not to "get too greedy," *i.e.*, it was to limit the excess profit included in its bid to 20-25% and was not to seek excess profits of 40-50%. Later review by Ambrosio of bids submitted by other coconspirators led him to the conclusion that most of them were submitting bids that included excess profits higher than the 20-25 % benchmark." Id at 1070.

Most of the economic analyses we surveyed would have called these different episodes and analyzed them separately, even though legally they were treated together. This clearly is a judgment call upon which reasonable

11. New York v. Cedar Park Concrete Corp, 85 Civ 1887 (2001) (concrete superstructure construction bid rigging during 7 year period 1978-1985 <sup>11</sup> )	5.87%	
12. North Texas Producers Ass'n v. Young, 308 F. 2d. 235 (5 <sup>th</sup> Cir. 1962) (conspiracy from Nov. 1956 to Feb. 1961 to exclude low cost milk seller <sup>12</sup> )	36%	
13. Ohio Valley Electric Corp. v. General Electric Co., 244 F. Supp. 914 (SDNY 1965) (bid rigging against U.S. electric utilities, began in 1930s but data available only for 1950-1959, in purchases of electric power generating and transmission equipment <sup>13</sup> )	10.9%	
14. Palmer v BRG of Georgia, 498 U.S. 46,47 (1990)(naked division of market by two providers of Bar Review courses, from 1980 to approximately Nov. 1990 <sup>14</sup> )	167%	
15. Pease v. Jasper Wyman & Son, 2004 ME 29 (2004) (conspiracy during August 1996 to October 1999 by four processors to suppress prices paid for wild blueberries <sup>15</sup> )	21.6%	32.8% <sup>16</sup>
16. Story Parchment Co. v Patterson	27.7%	

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people could differ. If they were treated as one larger conspiracy, the overcharges would total \$2,347,000 on a base of \$11,391,000, or 20.6% overall. Alternatively the average of the three computed overcharges is 31.6%. In addition, the Court found that a subcontract that should have been bid at \$512,000 was given to a fellow conspirator, in return for not bidding, for an additional \$338,000, a 66% overcharge. This was not included as a separate overcharge figure, however, since is subsumed in the conspiracy for its prime contract.

<sup>11</sup> The conspiracy was organized personally by Paul Castellano, on behalf of "the governing body of New York's five organized crime families". Yet the Court only found that it raised prices by 5.87%.

<sup>12</sup> This involved a horizontal conspiracy to exclude a low-priced milk seller that would have sold milk for 69 cents instead of 96 cents. He was awarded \$100,000 in lost profit damages for the period at issues. The important point for our study, however, is the Court's conclusion that that the horizontal competitors caused the price of the milk that plaintiff would have sold to consumers at 69 cents to be sold to them at 96 cents instead. The conspiracy prevented a 36% price drop. Id at 237.

<sup>13</sup> "This overcharge of \$5,624,401 is slightly under eleven per cent of the total final order price for all units (\$52,027,785) and slightly under ten per cent of the total final billed price, including escalation (\$57,116,819). Page 947 This totals 10.92% of the pre-collusive amount.

<sup>14</sup> This case involved an agreement by the only 2 Bar Review preparation companies in Georgia. They entered into a naked division of markets, after which the price of a Bar Review course in Georgia went from \$150 to "over \$400." Id. at 47. We will conservatively assume that the price only went up to \$400, an increase of 167%.

<sup>15</sup> This was a four year average, calculated from Solow exhibit 10, "Underpayment to Growers", whose figures were accepted by the jury. A \$56 million judgment was upheld.

<sup>16</sup> For 1997.

Parchment Paper Co., 282 U.S. 555 (1931)

(conspiracy by three manufacturers to monopolize and destroy plaintiff's business by predatory pricing in the market for vegetable parchment from Nov. 1927 to at least the bankruptcy of Aug. 1928<sup>17</sup>)

17. Strobl v. N. Y. Mercantile Exchange,

582 F. Supp. 770 (1984) (conspiracy from about Jan. 1976 to May 1976 by two processors to lower the price of a Maine potato futures contract on the NY Mercantile Exchange<sup>18</sup>)

48.6%

18. Union Carbide & Carbon Corp. v. Nisley, 300 F.2d 561 (10<sup>th</sup> Cir. 1961) (for recovery period Oct. 1938- March 1948 on a conspiracy that began 1933 by smelters to reduce prices paid for vanadium-bearing ore on the Colorado Plateau<sup>19</sup>)

22.5%

38-47.5%

19. United Nuclear Corp. v. General Atomic Co., 629 P. 2d 231 (N.M/ 1980)(global uranium cartel established 1972 but effective from about June 1974 to Dec. 1975<sup>20</sup>)

567%

20. U.S. v. Anderson, 326 F.3d 1319 11<sup>th</sup> Cir. 2003) (bid rigging on USAID contracts on construction of waste-water treatment plants in Egypt 1988-1996<sup>21</sup>)

16.4-39.2%

21. United States v. Andreas, 216 F.3d 645 (2000) (global

71.4%

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<sup>17</sup> Conspiracy to monopolize and destroy plaintiff's business. Jury verdict of \$65,000, before trebling. Property that cost \$235,000 allegedly reduced in value to \$75,000. So damages must have been  $65/235 = 27.7\%$ .

<sup>18</sup> Strobl v. New York Mercantile Exchange, 582 F. Supp. 770 (S.D.N.Y. 1984), motion to reduce award denied 590 F. Supp. 875 (S.D.N.Y. 1984), aff'd 768 F.2d 22 (2d Cir. 1985). "The \$460,000 figure reached by the jury, therefore, was the equivalent of a finding that the price of the May potato futures contract would have been approximately \$18.00, instead of \$9.25, had the market been operating solely on the basis of supply and demand...The jury could have concluded from the evidence of low supply that the price of Maine potato futures was artificially low during the conspiracy period." Id. at 779. Price therefore was depressed 48.6%.

<sup>19</sup> "In these circumstances, we cannot say that the jury's finding to the effect that the free market price of 2 percent vanadium ore for the period October 1938 through March 1948 was 40 cents per pound instead of 31 cents was clearly erroneous."

<sup>20</sup> United Nuclear Corp. v. General Atomic Co., 629 P.2d 231, 242 (N.M. 1980) "Fourth, between 1972, when the cartel apparently began, and 1975, when this suit was filed, the price of uranium in the United States increased from approximately \$6.00 per pound to approximately \$ 40.00 per pound." The Court concluded that the price of Uranium had increased by 567% during the period of the conspiracy but did not say that all of this increase was due to the activity of the cartel. For this reason this cartel's increase has been put in the maximum column, not the average column.

<sup>21</sup> Exhibits 16 and 24 say that the winning bids on the three contracts at issue were \$283.984 million On page 77 of the Transcript of Sentencing Before The Honorable Robert B. Propst, May 20, 2002, the judge found that the total overcharges for these three contracts were "greater than 40 and less than 80" million dollars. Using the \$40 m loss figure -- this would mean that the three jobs together should have cost \$244 million, so  $40/244$  is 16.4%. For the higher overcharge finding, the contracts should have totaled \$204 million, so  $80/204 = 39.2\%$ .

conspiracy 6/92-7/95 to raise lysine prices<sup>22</sup>)

22. United States v. Dynalectric Co., 859 F.2d 1559 (11 <sup>th</sup> Cir. 1988) (Bid Rigging on electrical subcontracting portion of at the Snapfinger Creek Wastewater Treatment Plant in Dekalb County, Georgia ; bid made on September 7, 1979 and the final payment to the loser was made on January 24, 1985. <sup>23</sup> )	34%	
23. U. S. v. Foley, 598 F. 2d 1323,1327 (C.A. Md., 1979 <sup>24</sup> ) (real estate companies in Montgomery County, MD agreed Sept. 5, 1975 to raise their sales commissions on houses; ended about April 1977)	16.7%	16.7%
24. In Re Vitamins Antitrust Litigation, Animal Science Products v. Chinook Group, Misc. No. 99-0197 TFA, M.D.L. No. 1285 (choline chloride global cartel jury verdict <sup>25</sup> )	38%	
25. Wall Products v. National Gypsum, 357 F. Supp. 832 (N.D. Calif. 1973) (U.S. conspiracy from December 15, 1965 until January 1, 1968 over price of gypsum wallboard <sup>26</sup> )	27%	

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<sup>22</sup> "The meeting ended without a sales volume allocation agreement, but two months later, at the recommendation of Whitacre, the cartel raised prices anyway, and prices rose from \$ .70 to \$ 1.05 per pound. ... [Much later] The producers also agreed on a new price of \$ 1.20 for the United States market." Id at 652-53

The Court inferred that at least one sale took place at \$1.20, so its maximum increase was  $(1.20-.70)/.70 = 71.4\%$ . As is typical, this Court was not perfectly clear as to what caused the price to rise. But the plain meaning of the quotation is that the Court found that, as a maximum, the cartel raised the price of Lysine by 71.4%.

In fact this would be a modest conclusion because the Court also wrote: "Together, the three parent companies produced all of the world's lysine until the 1990s, presenting an obvious opportunity for collusive behavior. Indeed the Asian cartel periodically agreed to fix prices, which at times reached as high as \$3.00 per pound." This would mean that the maximum increase was roughly  $(3.00-.70)/.70 = 329\%$

<sup>23</sup> 7. United States v. Dynalectric Co., 859 F.2d 1559 A \$1.7 million profit on a \$5 million contract is a profit of 34%.

<sup>24</sup> On Sept. 5, 1975, competing real estate executives agreed to raise their commission from 6% to 7%. "Within the following months each of the corporate defendants substantially adopted a seven percent commission rate." Id. at 1327. Since almost all, but not 100% of the sales were at a 7% Commission, 16.7% actually overstates the average actual rise somewhat.

<sup>25</sup> The jury verdict was \$49.54 million "before trebling and credit for prior settlements". On page 6 Plaintiff's expert gives total U.S. sales in the industry of \$130.85 million. So this one jury verdict was 38% of total industry sales, which means that the markup by defendant had to be significantly more than 38%. Surely 38% is a conservative estimate of the markup involved, despite the fact that the total industry sales came from the plaintiff's expert.

<sup>26</sup> Wall Products Co. v. National Gypsum Co., 357 F. Supp. 832 conspired among themselves and with others, to stabilize and maintain the price level of gypsum wallboard 27%

26. Webb v. Utah Tour Brokers Ass., 568 F. 2d 670  
(1977)(conspiracy by tour brokers to deny plaintiffs entry  
boycott, etc.<sup>27</sup>)

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5%

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<sup>27</sup> Webb v. Utah Tour Brokers Assn., 568 F. 2d 670, 676-77(1977). “They had been able to obtain the same transportation service for 70 cents per mile from the other licensed brokers. However, with Greyhound they were obliged to pay a Special Operations Bus Order tariff of three and one-half cents per person per mile. Of the eleven tours operated they had to pay this higher rate for eight tours. Plaintiffs calculated that they suffered a total loss of \$10,165 as a result of having to pay the higher tariff for the tours that they took.”  $3.5/70$  equals 5%.