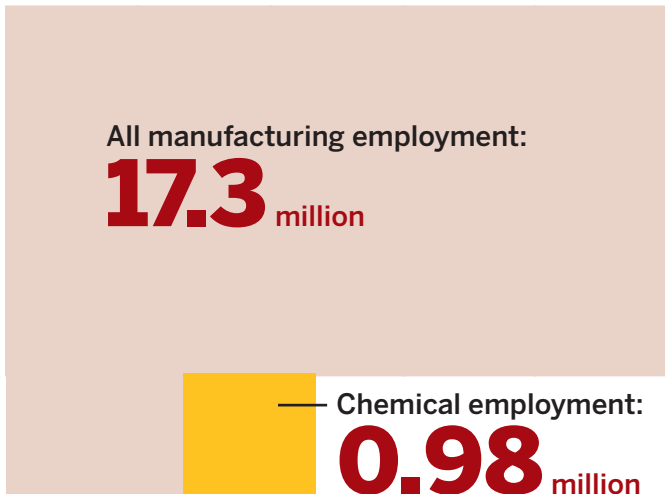
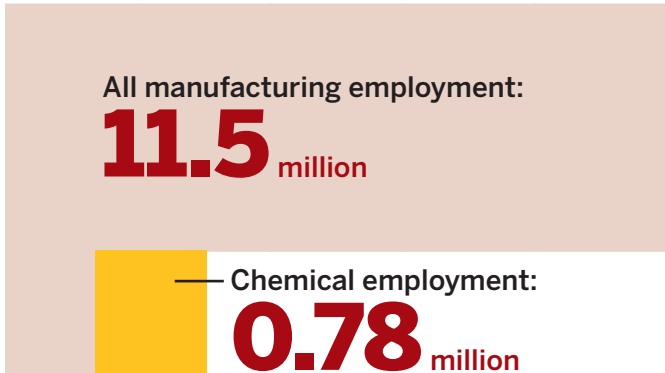


U.S. manufacturing employment in 2000:



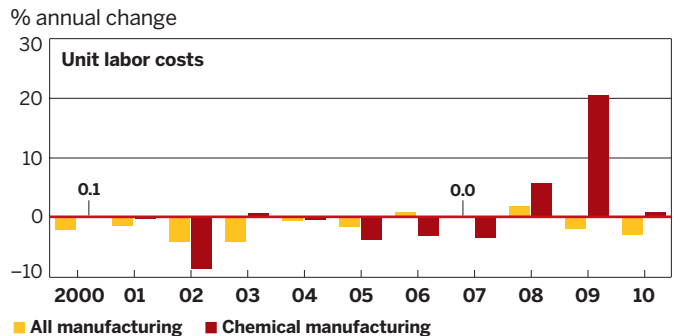
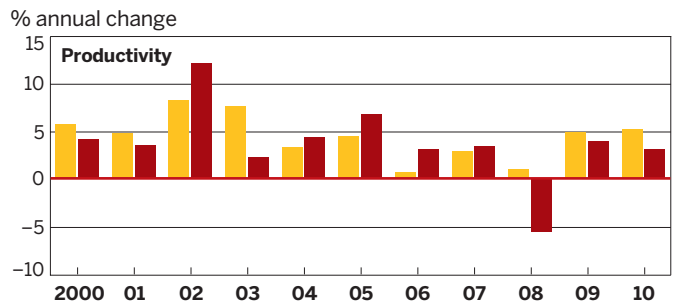
In 2010:



Number of employees per \$10 million in sales at chemical firms:



U.S. productivity rose, unit labor costs inched up



SOURCES: Federal Reserve Board, Bureau of Labor Statistics, C&EN estimates

CHEMICAL SECTOR'S JOBLESS RECOVERY

A wobbly rebound, high productivity, and pharma mergers prevented **EMPLOYMENT** growth

ALTHOUGH 2010 marked the return of demand and earnings for the global chemical industry, there was no corresponding growth in employment. Chemical firms that devoted themselves to running lean during the recession were able to ramp up production without hiring—or rehiring—workers.

In the U.S., a years-long decline in chemical industry employment steepened during the recession years. From 2007 to 2009, the industry lost 57,000 jobs, of

which 25,000 were in production, according to the U.S. Department of Labor. In the decade since 2000, the industry lost 196,000 workers, a shrinkage rate of 2.0% per year. The pace of the decline in the chemical industry, however, is slower than the 3.6% annual decrease in employment in the overall manufacturing sector.

In 2010, the chemical workforce fell by 20,000 jobs or 2.5%, according to the Labor Department. On the output side, however, U.S. chemical shipments rose 11.5% com-

pared with 2009. Of 16 companies tracked by C&EN, Dow Chemical, H.B. Fuller, NewMarket Corp., PPG Industries, and Stepan had more employees in 2010 than in 2007, the peak year of U.S. chemical production.

Meanwhile, pharmaceuticals topped most other U.S. industries in laying off workers in 2010. According to outplacement firm Challenger, Gray & Christmas, drugmakers pink-slipped 54,000 employees. Among those workers were roughly 19,000 who were victims of Pfizer's purchase of Wyeth and 16,000 who were dropped during the combination of Merck & Co. and Schering-Plough.

OUTSIDE THE CHEMICAL industry, high unemployment was a drag on the U.S. economy. Throughout 2010, the unemployment rate stayed above 9.5%, although economists marked June 2009 as the official end of the Great Recession. Workers

who did have jobs spent the year worried about losing them, and consumer confidence remained low.

Low confidence in the global recovery was also evident in the hiring rates in Europe, where chemical employment remained flat. Yet the statistics show Europe's chemical industry was busy in 2010.

Each of the four European nations tracked by C&EN posted double-digit increases in chemical shipments. The Netherlands saw the sharpest increase, at 23.7%. The continent's largest chemical-producing country—Germany—reported a 17.6% increase in value of shipments to \$226.5 billion.

The story was similar in Japan, where

chemical companies tracked by C&EN employed the same number of workers in 2010 as in 2009, even as production increased 9.0%. In contrast to the long-term trend in the U.S., chemical employment at the Japanese and European firms tracked by C&EN was respectively equal to and slightly higher in 2010 than it was a decade ago.

OVERALL U.S. EMPLOYMENT

The shrinking workforce in the chemicals sectors mirrored that of the overall manufacturing economy in 2010

THOUSANDS	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	ANNUAL CHANGE	
												2009-10	2000-10
Manufacturing	17,263	16,441	15,259	14,510	14,315	14,226	14,155	13,879	13,406	11,847	11,524	-2.7%	-3.6%
Chemicals	980	959	928	906	887	872	866	861	847	804	784	-2.5	-2.0
Basic chemicals	188	181	170	162	156	150	147	149	152	145	142	-2.1	-2.5
Resin, synthetic rubber & fibers	136	126	115	112	110	108	105	106	104	92	90	-2.2	-3.7
Agricultural chemicals	48	46	45	42	42	40	38	36	37	37	35	-5.4	-2.8
Pharmaceuticals	274	283	291	292	290	288	292	295	291	284	277	-2.5	0.1
Paints, coatings & adhesives	79	75	72	69	68	68	67	65	62	57	56	-1.8	-3.1
Soaps & toiletries	129	127	121	119	115	114	111	110	107	103	101	-1.9	-2.2
Other chemicals	127	120	114	111	107	104	105	101	95	86	83	-3.5	-3.8

NOTE: Average annual domestic employment. **SOURCE:** Department of Labor

U.S. COMPANY EMPLOYMENT

Chemical employment showed no recovery from 2009

THOUSANDS	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Air Products & Chemicals	17.5	17.8	17.2	18.5	19.9	20.2	20.7	22.1	21.1	18.9	18.3
Albemarle	2.5	3.0	3.0	3.0	3.7	3.7	3.6	4.1	4.1	4.0	4.0
Cabot	4.5	4.3	4.5	4.4	4.3	4.4	4.3	4.3	4.3	4.0	3.9
Cytec Industries (a)	4.8	4.5	4.3	4.5	4.5	7.3	6.7	6.8	6.7	5.8	6.0
Dow Chemical (b)	41.9	52.7	50.0	46.4	43.2	42.4	42.6	45.9	46.1	52.2	49.5
DuPont	93.0	79.0	79.0	81.0	60.0	60.0	59.0	60.0	60.0	58.0	60.0
Eastman Chemical	14.6	15.8	15.7	15.0	12.0	12.0	11.0	10.8	10.5	10.0	10.0
H.B. Fuller	5.2	4.9	4.6	4.5	4.5	4.0	3.7	3.2	3.1	3.1	3.3
Georgia Gulf (c)	1.3	1.2	1.2	1.2	1.2	1.1	6.7	5.2	4.5	3.5	3.9
W.R. Grace	6.3	6.4	6.4	6.3	6.4	6.4	6.4	6.5	6.3	5.9	6.0
Lubrizol (d)	4.4	4.5	5.2	5.0	7.8	7.5	6.7	6.9	7.0	6.7	6.9
NewMarket Corp. (e)	1.5	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.3	1.1	1.6
PPG Industries	35.6	34.9	34.1	32.9	31.8	30.8	32.2	34.9	44.9	39.9	38.3
Praxair	23.4	24.3	25.0	25.4	27.0	27.3	27.0	28.0	26.9	26.2	26.3
Solutia	10.2	9.2	7.3	6.3	5.7	5.4	5.1	6.0	3.7	3.4	3.3
Stepan	1.4	1.5	1.5	1.4	1.4	1.5	1.5	1.5	1.6	1.6	1.8
TOTAL EMPLOYEES	268.1	265.1	260.1	256.9	234.5	235.1	238.3	247.4	252.1	244.3	243.1

NOTE: Data are not restated for acquisitions, divestitures, or similar developments. **a** Acquired Surface Specialties in 2005. **b** Acquired Union Carbide in 2001 and Rohm and Haas in 2009. **c** Acquired Royal Group in 2006. **d** Acquired Noveon in 2004. **e** Formerly Ethyl Corp. **SOURCE:** Company data

EMPLOYMENT

EUROPE COMPANY EMPLOYMENT

Little change happened in the European chemical sector in 2010 compared with 2009

THOUSANDS	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Air Liquide (France)	30.3	30.8	30.8	31.9	35.9	35.9	36.9	40.3	43.0	42.3	43.6
AkzoNobel (Netherlands) (a)	69.8	70.4	60.7	64.6	61.5	61.3	61.9	42.6	60.0	54.7	55.6
Altana (Germany) (b)	ne	ne	ne	ne	ne	ne	4.5	4.6	4.8	4.8	4.9
Arkema (France) (c)	ne	ne	ne	ne	18.6	17.7	17.0	15.2	15.0	13.8	13.9
BASF (Germany) (d)	103.3	92.5	89.4	87.2	82.0	80.9	95.2	95.2	96.9	104.8	109.1
Bayer (Germany)	122.1	116.9	122.6	94.9	93.3	93.7	106.0	106.2	108.6	111.0	111.4
Clariant (Switzerland)	31.5	28.9	27.8	27.0	24.8	23.4	21.7	20.3	20.1	17.5	16.1
DSM (Netherlands)	21.8	21.5	18.5	26.1	24.5	22.8	22.2	23.3	23.6	22.7	21.9
Givaudan (Switzerland) (e)	5.1	5.3	5.8	6.0	5.9	5.9	6.1	8.8	8.8	8.5	8.6
Kemira (Finland) (f)	9.6	10.2	10.4	10.5	9.7	7.7	9.2	10.0	10.0	8.8	5.6
Lanxess (Germany) (g)	ne	ne	ne	20.5	19.7	18.3	16.5	14.6	14.8	14.3	14.6
Linde (Germany)	47.1	46.4	46.0	46.2	41.4	42.2	55.5	50.5	51.9	47.7	48.4
Lonza (Switzerland)	4.6	6.2	6.2	5.9	5.7	5.0	6.1	6.9	8.5	8.4	8.3
Merck (Germany) (h)	33.5	34.3	34.5	34.2	28.9	29.1	30.0	31.0	32.8	33.1	40.6
Rhodia (France)	29.4	26.9	24.5	23.0	20.6	19.4	17.1	15.5	14.4	13.6	14.1
Solvay (Belgium) (i)	32.3	29.4	30.3	30.1	29.3	28.7	29.3	28.3	29.4	28.2	16.8
Syngenta (Switzerland)	21.0	20.5	20.0	19.1	19.5	19.0	19.5	21.2	24.1	25.9	26.2
Wacker (Germany) (j)	ne	ne	ne	ne	14.7	14.4	14.7	15.0	15.9	15.6	16.3
TOTAL EMPLOYEES (k)	561.4	540.2	527.5	527.2	536.0	525.4	569.4	549.5	582.6	575.7	576.0

a Divested pharmaceuticals in 2007 and purchased ICI in 2008. **b** Divested pharmaceuticals in 2006 and went private in 2010. **c** Spun off from Total in 2006; prior figures are pro forma. **d** Acquired Engelhard in 2006 and Ciba in 2009. **e** Spun off from Roche in 2000. **f** Spun off Tikkurila in 2010. **g** Spun off from Bayer in 2005; prior figures are pro forma. **h** Acquired Millipore in 2010. **i** Sold its pharmaceuticals unit in 2010. **j** Became a publicly traded company in 2005. **k** For companies reporting. **ne** = nonexistent. **SOURCE:** Company data

JAPAN COMPANY EMPLOYMENT

Overall headcount remained flat last year

THOUSANDS	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Asahi Kasei	26.7	26.2	25.7	25.0	23.8	23.0	23.7	23.9	24.2	25.1	25.0
DIC (a)	30.3	28.4	27.0	26.5	26.8	25.6	25.4	25.2	23.6	22.6	21.6
JSR	4.4	4.4	4.3	4.3	4.4	4.6	4.7	5.1	5.3	5.2	5.3
Kaneka	7.0	6.7	6.7	6.6	6.6	7.3	7.4	7.5	7.3	7.6	8.1
Mitsubishi Chemical (b)	33.0	38.6	37.6	33.5	33.3	33.0	33.4	39.3	41.8	53.9	53.9
Mitsui Chemicals	12.8	13.2	12.7	12.3	12.2	12.5	12.5	12.8	12.0	12.9	12.8
Shin-Etsu Chemical	19.4	16.5	16.6	17.4	18.2	18.9	19.2	20.2	19.2	16.9	16.3
Showa Denko	13.2	12.0	10.9	10.6	11.2	11.1	11.2	11.3	11.8	11.6	11.6
Sumitomo Chemical	17.4	17.0	17.9	19.0	20.2	24.2	24.7	25.6	26.9	27.8	29.4
Teijin	22.3	24.0	23.3	20.6	19.0	18.8	19.1	19.1	19.4	18.8	17.5
Toray	35.7	34.9	33.8	32.9	33.7	34.7	36.6	38.6	37.9	37.9	38.7
Tosoh	8.1	9.4	9.2	9.2	9.1	9.5	10.5	11.1	11.2	11.1	11.2
TOTAL EMPLOYEES	230.4	231.3	225.7	218.0	218.4	223.1	228.4	239.7	240.6	251.4	251.4

NOTE: Fiscal year ends on March 31 of the following year at all companies, except Showa Denko, where it ends on Dec. 31. **a** Formerly Dainippon Ink & Chemicals. **b** Acquired Mitsubishi Rayon in 2009. **SOURCE:** Company data

U.S. PRODUCTION WORKERS

The annual loss in production workers slowed in 2010 compared with the recession's impact in 2009

THOUSANDS	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	ANNUAL CHANGE	
												2009-10	2000-10
Manufacturing	12,428	11,677	10,768	10,189	10,072	10,060	10,137	9,975	9,629	8,322	8,075	-3.0%	-3.8%
Chemicals	588	562	532	525	520	510	508	504	513	479	472	-1.5	-2.0
Basic chemicals	122	115	104	100	95	86	83	88	96	95	92	-3.2	-2.5
Resin, synthetic rubber & fibers	96	89	81	78	75	71	70	70	69	60	58	-3.3	-4.5
Agricultural chemicals	32	30	30	29	29	29	29	25	26	25	24	-4.0	-2.6
Pharmaceuticals	132	132	128	133	139	144	149	153	159	157	160	1.9	1.8
Paints, coatings & adhesives	42	39	38	37	40	41	39	38	37	32	32	0.0	-2.4
Soaps & toiletries	82	80	76	77	74	73	72	69	68	62	62	0.0	-2.5

NOTE: Average annual domestic employment. **SOURCE:** Department of Labor

U.S. PAY

Most chemical workers saw a pay increase in 2010

	HOURLY EARNINGS				WEEKLY EARNINGS			
	2007	2008	2009	2010	2007	2008	2009	2010
Manufacturing	\$17.26	\$17.75	\$18.24	\$18.61	\$711.56	\$724.46	\$726.12	\$765.08
Chemicals	19.55	19.50	20.30	21.08	819.54	809.29	841.18	888.84
Basic chemicals	23.23	23.30	24.09	24.93	1,010.21	1,030.55	1,056.85	1,113.94
Resin, synthetic rubber & fibers	21.04	20.54	21.08	21.11	911.97	881.65	907.46	935.54
Agricultural chemicals	21.62	20.36	19.06	19.56	960.05	831.13	768.96	761.52
Pharmaceuticals	20.35	20.10	21.12	21.95	840.75	821.24	862.90	923.42
Paints, coatings & adhesives	15.97	16.48	16.85	16.94	668.18	689.14	679.11	678.74
Soaps & toiletries	15.21	15.21	15.71	16.90	601.55	587.91	600.34	642.50
Other chemicals	16.23	16.08	17.04	18.41	668.97	652.31	719.23	803.02

NOTE: For production workers in domestic employment. **SOURCE:** Department of Labor

U.S. PRODUCTIVITY

Nearly all sectors increased production but not hours worked ...

PRODUCTIVITY (a), 2004 = 100	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	ANNUAL CHANGE,
												2009-10
Manufacturing	79.9	83.7	90.5	97.1	100.0	104.3	105.1	109.7	109.0	111.8	117.6	5.2%
Chemicals	81.0	83.9	93.6	96.2	100.0	106.6	109.1	117.2	107.4	105.6	108.9	3.1
Basic chemicals	71.5	68.8	81.1	87.4	100.0	114.0	118.9	128.8	102.6	102.4	112.2	9.6
Resin, synthetic rubber & fibers	86.4	86.3	96.4	97.5	100.0	112.1	112.9	120.1	104.5	119.5	127.5	6.7
Agricultural chemicals	84.2	85.4	90.7	96.3	100.0	104.4	106.3	118.9	107.6	123.3	133.0	7.9
Pharmaceuticals	93.0	97.6	104.1	103.4	100.0	101.9	103.4	103.0	97.7	93.3	89.8	-3.8
Paints, coatings & adhesives	92.9	100.4	101.9	105.7	100.0	97.9	97.6	98.4	91.9	91.8	99.4	8.3
Soaps & toiletries	73.1	76.2	89.5	86.4	100.0	110.3	116.2	133.8	128.8	129.7	135.5	4.5

... and the resulting uptick in productivity outpaced hourly pay increases

UNIT LABOR COSTS (b), 2004 = 100	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	ANNUAL CHANGE,
												2009-10
Manufacturing	111.0	109.3	104.6	100.4	100.0	98.3	99.1	97.5	100.9	101.1	98.0	-3.1%
Chemicals	110.1	109.3	100.1	100.3	100.0	96.3	93.7	87.0	94.7	100.3	101.0	0.7
Basic chemicals	127.3	134.6	116.3	109.3	100.0	90.2	84.3	77.9	98.1	101.6	96.0	-5.5
Resin, synthetic rubber & fibers	108.4	110.9	101.1	100.4	100.0	93.1	96.5	96.1	107.7	115.6	108.4	-6.2
Agricultural chemicals	101.5	107.6	110.5	101.0	100.0	105.6	104.6	96.0	99.9	89.2	84.9	-4.8
Pharmaceuticals	88.9	87.1	83.3	91.5	100.0	100.0	98.8	94.6	98.5	129.0	139.4	8.1
Paints, coatings & adhesives	93.3	90.5	94.4	93.1	100.0	102.4	101.2	99.8	110.3	112.4	104.4	-7.1
Soaps & toiletries	128.2	125.7	108.1	111.3	100.0	94.6	87.8	77.2	80.2	72.3	74.4	2.9

a Productivity is output per hour, calculated by dividing indexes for production by indexes for workhours of production employees. **b** Unit labor costs are calculated by dividing indexes for hourly wages by indexes for output per workhour. **SOURCES:** Federal Reserve Board, Department of Labor