Table I
Number of Funds in Private Equity Datasets

This table shows the number of funds in the various private equity datasets, for which performance data are available by vintage year (as defined by each source). Preqin has summary performance information (IRR and investment multiples) for the number of funds shown; it only has cash-flow information, which is required for computing public market equivalent measures of performance, for a subset of these funds. Panel A focuses on buyout funds, and Panel B on venture capital, using the classifications provided by the suppliers or authors. Only funds with a North American geographical focus are included.

Panel A : Buyout Funds

Vintage	Burgiss	Venture Economics	Preqin	Cambridge Associates	Kaplan-Schoar	Robinson-Sensoy
1984	2	7	6		6	
1985	1	7	3		12	
1986	5	10	9	8	16	1
1987	7	25	7	9	22	8
1988	7	17	14	14	21	14
1989	8	24	10	15	22	16
1990	2	9	14	5	14	7
1991	4	5	8	11	6	2
1992	5	15	17	12	17	4
1993	11	21	18	22	11	9
1994	13	26	24	17	6	24
1995	17	23	22	28	7	24
1996	9	23	24	33		41
1997	30	40	35	44		40
1998	38	53	50	51		59
1999	28	38	43	49		59
2000	39	46	67	65		68
2001	26	27	25	18		26
2002	21	15	28	29		5
2003	13	13	29	32		8
2004	46	17	35	58		3
2005	57	20	63	73		2
2006	67	26	60	64		8
2007	74	22	65	67		6
2008	68	14	53	52		12
Total	598	543	729	776	160	446
Total 2000-08	*411*	*200*	*425*	*458*		
Total 1990-99	*157*	*253*	*255*	*272*	*61*	*269*
Total 1984-89	*30*	*90*	*49*	*46*	*99*	*39*

Panel B : Venture Capital Funds

Vintage	Burgiss	Venture Economics	Preqin	Cambridge Associates	Kaplan-Schoar	Robinson-Sensoy
1984	18	63	17	32	57	6
1985	20	46	23	25	37	5
1986	12	41	19	30	36	3
1987	17	64	21	34	63	6
1988	16	44	24	26	42	9
1989	18	50	38	37	45	10
1990	13	21	20	16	20	1
1991	6	18	12	17	11	
1992	17	27	22	23	18	4
1993	13	41	32	37	45	5
1994	20	36	31	42	49	7
1995	18	49	29	34	43	13
1996	20	36	35	40		13
1997	33	64	54	73		19
1998	46	78	59	81		36
1999	65	107	78	112		40
2000	80	122	115	156		55
2001	48	59	66	52		18
2002	18	20	47	32		7
2003	25	17	37	35		
2004	32	22	51	64		
2005	48	20	58	58		1
2006	62	37	77	69		
2007	65	18	71	52		2
2008	45	14	57	55		
Total	775	1114	1093	1232	466	260
Total 2000-08	*423*	*329*	*579*	*573*		
Total 1990-99	*251*	*477*	*372*	*475*	*186*	*138*
Total 1984-89	*101*	*308*	*142*	*184*	*280*	*39*

Table II
Private Equity Fund Internal Rates of Return and Investment Multiples

This table shows average Internal Rates of Return (IRR) and Investment Multiples, by vintage year on the individual funds using the Burgiss data. Investment multiples are ratio of total value to paid-in capital (TVPI). Total value is the sum of the cash returned to investors and the remaining net asset value (NAV) as estimated by the private equity fund manager. Given the limited life of the funds, for the early vintage funds the vast majority of the investments have been realized, whereas the opposite is true for the later vintages, for which the reported IRRs and multiples relate mainly to NAVs, with little cash having been returned to investors. Weighted averages use the capital committed for each fund as a proportion of the total commitments for each vintage year. Panel A focuses on buyout funds, and Panel B on venture capital, as classified by Burgiss. Only funds with a North American geographical focus are included.

	Panel A Buyout Funds								Panel B Venture Capital Funds							
			Internal Rate of Return			Investment Multiple					Internal Rate of Return			Investment Multiple		
Vintage year	Funds	Median % Realised	Average	Median	Weighted average	Average	Median	Weighted average	Funds	Median % Realised	Average	Median	Weighted average	Average	Median	Weighted average
1984	2	100.0	10.6	10.6	15.8	2.44	2.44	3.28	18	100.0	8.2	6.9	7.9	1.78	1.71	1.73
1985	1	100.0	13.7	13.7	13.7	2.66	2.66	2.66	20	100.0	5.5	8.7	7.1	1.96	1.81	1.93
1986	5	100.0	13.6	16.8	16.0	2.40	2.36	3.27	12	100.0	9.0	9.3	9.4	1.83	1.93	1.82
1987	7	100.0	17.3	16.2	15.3	2.93	2.55	2.58	17	100.0	15.8	16.7	20.2	2.70	2.35	2.77
1988	7	100.0	14.4	10.1	18.4	2.03	1.74	2.32	16	100.0	17.9	21.6	24.4	2.45	2.55	2.88
1989	8	100.0	20.6	22.4	21.1	2.55	2.69	2.75	18	100.0	20.5	15.3	25.7	2.92	2.41	3.09
1990	2	97.8	31.9	31.9	52.9	3.03	3.03	3.37	13	100.0	25.3	21.7	29.5	2.96	2.48	3.30
1991	4	100.0	25.7	24.9	27.8	2.45	2.54	2.54	6	100.0	28.1	24.4	28.5	3.11	2.70	2.92
1992	5	100.0	11.2	10.7	15.0	1.68	1.41	1.88	17	100.0	21.0	14.2	24.8	2.69	2.07	2.72
1993	11	100.0	31.0	19.1	26.0	2.62	2.07	2.48	13	100.0	47.1	40.9	51.9	6.65	3.28	6.34
1994	13	100.0	29.6	25.7	34.5	2.73	2.18	3.29	20	100.0	41.7	31.8	41.4	5.27	3.05	6.58
1995	17	99.5	20.9	10.5	16.9	2.08	1.51	1.82	18	100.0	49.2	28.9	46.4	3.64	2.50	3.55
1996	9	100.0	6.0	5.7	2.4	1.46	1.30	1.17	20	98.3	64.5	25.2	76.7	5.92	2.06	6.33
1997	30	98.3	8.6	5.5	8.8	1.42	1.28	1.50	33	97.6	65.9	26.3	76.1	3.03	1.87	3.28
1998	38	96.9	6.4	8.0	3.6	1.42	1.39	1.28	46	97.1	16.3	-1.2	15.5	1.55	0.93	1.60
1999	28	89.9	3.3	4.3	4.8	1.31	1.21	1.40	65	85.0	-7.4	-5.6	-4.5	0.81	0.73	0.94
2000	39	62.2	12.7	11.9	14.3	2.66	1.58	1.75	80	66.7	-2.7	-2.1	-1.3	0.91	0.88	0.97
2001	26	57.5	13.7	14.6	15.1	1.58	1.72	1.67	48	60.5	-1.7	-2.4	-0.7	0.97	0.87	1.01
2002	21	44.9	16.1	16.4	18.4	1.72	1.79	1.84	18	55.0	-1.1	-0.2	0.6	1.01	0.99	1.07
2003	13	29.4	19.5	16.2	22.5	1.98	1.75	1.80	25	41.7	-2.1	0.1	0.9	0.99	1.00	1.11
2004	46	18.1	12.8	11.7	15.4	1.53	1.50	1.64	32	23.9	-1.5	-1.0	0.3	1.01	0.97	1.07
2005	57	9.7	6.8	7.6	7.1	1.26	1.25	1.27	48	17.3	2.2	0.5	3.3	1.37	1.02	1.31
2006	67	10.8	2.6	1.2	0.5	1.08	1.03	1.02	62	16.0	-1.3	-2.4	0.6	1.01	0.95	1.04
2007	74	1.9	3.7	6.2	4.4	1.11	1.12	1.09	65	3.0	1.7	2.6	3.2	1.06	1.06	1.09
2008	68	6.3	3.2	2.8	1.5	1.07	1.04	1.04	45	13.0	-2.8	-1.6	-4.5	0.99	0.98	0.97
Average	598	72.9	14.2	13.0	15.7	1.97	1.81	2.03	775	85.8	16.8	11.1	19.3	2.34	1.73	2.46
Average 2000s	*411*	*26.8*	*10.1*	*9.8*	*11.0*	*1.55*	*1.42*	*1.46*	*423*	*33.0*	*-1.0*	*-0.7*	*0.3*	*1.03*	*0.97*	*1.07*
Average 1990s	*157*	*98.2*	*17.5*	*14.6*	*19.3*	*2.02*	*1.79*	*2.07*	*251*	*97.8*	*35.2*	*20.7*	*38.6*	*3.56*	*2.17*	*3.76*
Average 1980s	*30*	*100.0*	*15.0*	*14.9*	*16.7*	*2.50*	*2.41*	*2.81*	*101*	*100.0*	*12.8*	*13.1*	*15.8*	*3.27*	*2.13*	*2.37*

Table III
Private Equity Fund Public Market Equivalent Ratios

This table shows the average Public Market Equivalent (PME) ratios by vintage year, comparing private equity returns to equivalent timed investments in the S&P 500 using the Burgiss data. Vintage years are defined by the date of the first investment by a fund. Weighted averages use the capital committed to the funds as weights. Only funds with a North American geographical focus are included.

Vintage year	Panel A: Buyout Fund PMEs				Panel B: Venture Capital Fund PMEs			
	Funds	Average	Median	Weighted average	Funds	Average	Median	Weighted average
1984	2	0.87	0.87	1.09	18	0.70	0.63	0.69
1985	1	0.91	0.91	0.91	20	0.71	0.70	0.73
1986	5	1.00	1.11	1.11	12	0.75	0.73	0.80
1987	7	1.25	1.21	1.20	17	1.18	1.09	1.29
1988	7	0.98	0.80	1.13	16	1.18	1.31	1.44
1989	8	1.26	1.28	1.22	18	1.34	0.95	1.52
1990	2	1.57	1.57	2.34	13	1.50	1.18	1.66
1991	4	1.23	1.23	1.32	6	1.37	1.26	1.35
1992	5	0.79	0.87	0.89	17	1.27	0.94	1.34
1993	11	1.35	1.11	1.24	13	2.79	1.54	2.74
1994	13	1.48	1.34	1.75	20	2.40	1.43	2.86
1995	17	1.34	1.00	1.20	18	2.16	1.48	2.09
1996	9	1.13	1.01	0.90	20	3.79	1.75	4.17
1997	30	1.23	1.16	1.30	33	2.43	1.45	2.65
1998	38	1.35	1.32	1.21	46	1.43	0.93	1.48
1999	28	1.19	1.06	1.27	65	0.76	0.65	0.90
2000	39	1.42	1.39	1.47	80	0.79	0.77	0.85
2001	26	1.31	1.43	1.38	48	0.80	0.71	0.84
2002	21	1.42	1.47	1.53	18	0.82	0.79	0.88
2003	13	1.75	1.56	1.58	25	0.88	0.90	0.99
2004	46	1.40	1.35	1.51	32	0.90	0.85	0.96
2005	57	1.20	1.19	1.23	48	1.27	0.95	1.23
2006	67	1.03	0.97	0.99	62	0.93	0.85	0.97
2007	74	1.03	1.03	1.02	65	0.97	0.96	0.99
2008	68	0.91	0.88	0.90	45	0.84	0.81	0.84
Average	**598**	**1.22**	**1.16**	**1.27**	**775**	**1.36**	**1.02**	**1.45**
Average 2000s	*411*	*1.27*	*1.25*	*1.29*	*423*	*0.91*	*0.84*	*0.95*
Average 1990s	*157*	*1.27*	*1.17*	*1.34*	*251*	*1.99*	*1.26*	*2.12*
Average 1980s	*30*	*1.04*	*1.03*	*1.11*	*101*	*0.98*	*0.90*	*1.08*

Table IV
Private Equity PMEs Using Alternative Public Market Indices

This table shows vintage-year average, average and median Public Market Equivalent ratios calculated with alternative market benchmarks. The Russell 3000 index is based on the largest 3000 U S companies. The Russell 2000 measures the performance of small-cap stocks and is based on a 2000 company subset of the Russell 3000. The Russell 2000 Growth and 2000 Value indices are subsets of the Russell 2000 chosen on the basis of forecasted growth rates and price-to-book ratios. We also include selected Fama-French size deciles The final columns calculate PMEs using multiples of the S&P 500 to approximate the effect of betas of 1 5 and 2. Panel A focuses on the 598 buyout funds, and Panel B on the 775 venture capital funds, in the Burgiss dataset

Panel A: Buyout Funds

			Russell indices			Fama French				Multiple of S&P 500	
Vintage years	S&P 500	Nasdaq	3000	2000	2000 value	8th	6th	4th	2nd	1.5X	2X
1984	0 87	0.97	0.90	1 15	1 07	0.93	0 96	1.15	1.39	0 59	0.44
1985	0 91	0.98	0.94	1.18	1 09	0 98	0 99	1.20	1.45	0 6	0.42
1986	1.00	1.02	1.02	1.18	1.10	1.05	1.05	1.21	1.36	0 75	0.61
1987	1 25	1.2	1.27	1.43	1.32	1.31	1 30	1.49	1.59	0 95	0.75
1988	0.98	0.9	0 99	1 05	0 99	1 00	0.97	1.09	1.14	0 74	0.58
1989	1 26	1 15	1.27	1 34	1 23	1 29	1.26	1.36	1.36	0.95	0.76
1990	1.57	1 48	1 57	1 58	1 43	1 49	1.51	1.56	1.47	1 23	1.03
1991	1 23	1.15	1.25	1.40	1.31	1.35	1.32	1.39	1.35	0.95	0.77
1992	0 79	0 78	0 82	0.97	0.92	0 92	0.98	0.98	0 88	0.58	0.44
1993	1.35	1 33	1.38	1 62	1 56	1.53	1 60	1 59	1.45	1 03	0.81
1994	1 48	1 45	1.52	1 78	1 70	1 59	1.76	1.72	1.51	1.13	0.9
1995	1.34	1.3	1 35	1 5	1.43	1.33	1.54	1.48	1.25	1.13	0.99
1996	1.13	1.26	1.12	1.02	0.83	0.92	1.05	1.00	0 80	1.06	1 07
1997	1.23	1.3	1.19	1 01	0.88	0.94	1.03	0 99	0 83	1.21	1.28
1998	1.35	1.56	1.3	1.01	0 81	0.98	1.02	0.99	0.85	1 39	1.51
1999	1.19	1.36	1.15	0.92	0.74	0.91	0 88	0 89	0.84	1.2	1.28
2000	1 42	1 48	1 38	1.18	1 05	1 17	1 08	1.12	1.16	1.38	1.43
2001	1 31	1 27	1.28	1.15	1 12	1.12	1.04	1.09	1.16	1.23	1.24
2002	1 42	1 34	1 39	1.28	1.29	1.22	1 12	1 21	1.32	1 34	1.35
2003	1 75	1.66	1.72	1 63	1.66	1.54	1.39	1.54	1.71	1 75	1.87
2004	1 40	1.3	1.38	1.32	1.36	1.24	1.12	1 25	1.35	1.42	1.54
2005	1 20	1.1	1 19	1 12	1.17	1.07	0.97	1.07	1.14	1 26	1.39
2006	1 03	0.94	1.02	0 96	0.99	0.95	0 87	0.94	0.99	1.1	1.19
2007	1 03	0 95	1.02	0.94	0.97	0.95	0.90	0 94	0.96	1.07	1.13
2008	0 91	0.86	0.91	0.85	0 87	0 89	0.88	0.91	0.90	0.94	0.91
Average	1.22	1 20	1.21	1 22	1.16	1.15	1.14	1.21	1.21	1 08	1.03
Average 2000s	*1 27*	1.21	1 25	1.16	1.16	*1.13*	*1.04*	*1.12*	*1.19*	1.28	1 34
Average 1990s	*1.27*	1 30	1.27	1 28	1.16	*1.20*	*1.27*	*1.26*	*1.12*	1.09	1.01
Average 1980s	*1 07*	1 04	1.07	1.22	1 13	*1.09*	*1 09*	*1 25*	*1.38*	0 76	0 59
Sample average	1 20	1.17	1 18	1.11	1.07	1.07	1.04	1 09	1.09	1 18	1.21
Sample median	1 11	1 05	1.09	1.02	0.99	1.00	0.96	1.01	1.01	1.11	1.13

Table IV
Private Equity PMEs Using Alternative Public Market Indices (continued)

Panel B: Venture Capital Funds

Vintage years	S&P 500	Nasdaq	Russell indices			Fama French				Multiple of S&P 500	
			3000	2000	2000 growth	8th	6th	4th	2nd	1 5X	2X
1984	0.70	0.80	0 73	0.92	1.01	0.75	0.78	0.91	1.11	0.48	0 35
1985	0 71	0 76	0 73	0.91	0.98	0.75	0 77	0.93	1.10	0.49	0.36
1986	0 75	0 73	0 76	0 86	0.95	0 76	0.75	0.89	1.00	0.54	0.41
1987	1 18	1.10	1.18	1 32	1.42	1.20	1.18	1.36	1.48	0.85	0.66
1988	1 18	1 07	1 18	1 26	1.34	1.20	1 16	1.29	1.32	0.87	0.66
1989	1 34	1.18	1.35	1.45	1 57	1.40	1.36	1 48	1.47	0.98	0.74
1990	1 50	1 32	1 50	1.55	1.68	1.52	1.48	1.58	1.54	1.14	0 89
1991	1.37	1 23	1 40	1.64	1.75	1 55	1 61	1 66	1.53	0.98	0 74
1992	1 27	1 24	1 32	1.56	1.68	1 50	1.55	1.57	1.46	0.92	0.68
1993	2.79	2 38	2 92	3.88	3 90	3.55	3.92	3.86	3.42	1.91	1.35
1994	2 40	2 10	2 50	3 23	3 35	2 86	3 33	3.24	2.75	1.70	1.24
1995	2 16	1.89	2.21	2.59	2.67	2.33	2.67	2.58	2.25	1.71	1.40
1996	3.79	3 01	3 85	4 46	4.34	3.92	4.62	4.47	3.82	3.13	2.69
1997	2 43	2 05	2 42	2 45	2.42	2.21	2.53	2.47	2.12	2.26	2.15
1998	1.43	1 52	1 38	1 15	1.37	1 08	1.18	1.14	0.97	1 47	1.58
1999	0 76	0.89	0 73	0 57	0.72	0 56	0 54	0 55	0 52	0.81	0.92
2000	0 79	0.83	0 77	0 64	0.73	0.63	0 56	0.61	0.64	0.80	0.87
2001	0.80	0.76	0.78	0.69	0.72	0.68	0.60	0 66	0.72	0.80	0 84
2002	0.82	0.76	0 80	0 73	0 73	0.71	0.63	0 70	0.78	0.81	0.84
2003	0.88	0.82	0.87	0.82	0.80	0 80	0.71	0.80	0.88	0.91	0.98
2004	0 90	0.82	0 89	0.83	0 80	0.81	0 73	0 81	0.87	0 95	1.01
2005	1 27	1.16	1 26	1.18	1.13	1.15	1.03	1 14	1.22	1.36	1.48
2006	0 93	0.85	0.92	0.85	0.82	0.85	0.79	0 85	0.87	0 98	1.02
2007	0 97	0.89	0 95	0 88	0.86	0.91	0.86	0.91	0.92	1.02	1.04
2008	0 84	0 78	0 83	0 77	0.75	0.79	0.78	0 80	0.79	0 84	0.81
Average	1 36	1 24	1.37	1 49	1.54	1.38	1.44	1 49	1.42	1 15	1 03
Average 2000s	*0 91*	0.85	0.90	0 82	0.82	*0.81*	*0.74*	*0.81*	*0.85*	0.94	0.99
Average 1990s	*1.99*	1 76	2 02	2 31	2.39	*2.11*	*2.34*	*2.31*	*2.04*	1.60	1.36
Average 1980s	*0.98*	0 94	0 99	1 12	1 21	*1.01*	*1.00*	*1.14*	*1.25*	0.70	0.53
Sample average	1.20	1 12	1.19	1 21	1 25	1.14	1.17	1 21	1 17	1 10	1 07
Sample median	0 88	0.86	0.87	0 83	0.85	0.81	0 76	0.83	0.84	0.87	0.85

Table V
The Relationship Between Aggregate Flows into Private Equity and Performance

This table reports regressions where the dependent variable is fund performance – as measured by IRR, Multiple or PME – and the explanatory variable is an estimate of capital flows into private equity. We measure capital flows by summing the capital commitments (as estimated by Private Equity Analyst, see Internet Appendix Table IA.I) in the current and previous vintage years, and then take the ratio of this sum to the aggregate U.S. stock market value at the start of the current vintage year. This provides a measure of the amount of capital available to fund private equity deals. The performance measures are weighted averages, where the weights are the proportion of capital committed in each vintage year to the total capital committed over the vintages included in the regression. Given the small sample sizes in early vintages, only vintage years from 1993 onwards are included. See Tables II and III for explanations of the performance measures. Separate regressions are estimated for buyout funds and venture capital funds. Standard errors are reported in brackets. ***, ** and * denote significance at the 1%, 5% and 10% respectively.

	Buyout Funds			VC Funds		
Dependent variable:	PME	IRR	Multiple	PME	IRR	Multiple
Capital Commitments to	-31.7***	-12.23***	-71.9***	-278.9**	-75.0*	-625.8**
Total Stock Market Value	[9.9]	[3.97]	[23.9]	[128.6]	[37.9]	[268.8]
Constant	1.58	0.24	2.30	2.48	0.43	4.39
	[0.10]	[0.04]	[0.25]	[0.47]	[0.14]	[0.98]
N	16	16	16	16	16	16
R-squared	0.42	0.40	0.39	0.25	0.22	0.28

Table VI
The Relationship Between Private Equity Fund Size and Performance

This table examines whether fund size affects performance. In Panel A, funds are classified into size quartiles by decade. The cut off points for each quartile, by decade, are reported. The performance – as measured by PME – is then analyzed for these size quartiles. Buyout funds and venture capital funds are considered separately. Panel B reports regressions where the dependent variable is PME, and the explanatory variables are fund size quartiles (calculated as above) and, for some regressions, vintage year dummies. Standard errors are reported in brackets. ***, ** and * denote significance at the 1%, 5% and 10% respectively.

Panel A: Average Performance by Fund Size Quartile

	Buyout Funds				Venture Capital Funds			
	Bottom quartile	Median	Top Quartile	Mean	Bottom quartile	Median	Top quartile	Mean
Size Cutoffs ($ Millions)								
1980s	85	215	425	390	34	55	90	77
1990s	200	485	998	782	81	137	250	191
2000s	284	700	1530	1420	137	278	475	358
PME								
Small Funds	0.80	1.02	1.37	1.16	0.57	0.78	1.08	1.03
2nd Quartile Funds	0.90	1.16	1.49	1.23	0.61	0.90	1.24	1.25
3rd Quartile Funds	0.93	1.14	1.40	1.21	0.69	0.96	1.30	1.34
Large Funds	0.91	1.14	1.43	1.19	0.70	0.90	1.14	1.18

Panel B: Regressions of PME on Fund Size Quartiles

Dependent variable: PME	Buyout Funds		Venture Capital Funds	
2nd size quartile	0.065	0.039	0.219	0.138
	[0.059]	[0.057]	[0.149]	[0.140]
3rd size quartile	0.042	0.059	0.314**	0.318**
	[0.059]	[0.057]	[0.150]	[0.141]
4th (highest) size quartiile	0.027	0.031	0.149	0.349**
	[0.059]	[0.057]	[0.150]	[0.145]
Vintage year dummies	No	Yes	No	Yes
Funds	598	598	775	775
R-squared	0.00	0.15	0.01	0.21

Table VII
The Relationship Between PME, IRR and Multiples

This table reports fund-level regressions where PME is the dependent variable. Given the small sample sizes in early vintages, only vintage years from 1993 onwards are included. Ordinary standard errors are reported in brackets, and standard errors clustered by vintage year are in curly brackets. ***, ** and * denote significance at the 1%, 5% and 10% respectively using standard errors clustered by vintage.

	Buyout Funds			VC Funds		
IRR	2.52***		0.43	3.47***		1.21***
	[0.07]		[0.07]	[0.11]		[0.07]
	{0.43}		{0.25}	{0.55}		{0.25}
Multiple		0.71***	0.62***		0.56***	0.44***
		[0.01]	[0.02]		[0.01]	[0.01]
		{0.06}	{0.10}		{0.07}	{0.07}
Vintage Year Dummies	Y	Y	Y	Y	Y	Y
N	557	557	557	638	638	638
R-squared	0.75	0.92	0.92	0.71	0.91	0.94

Table VIII
Actual PMEs and Implied PMEs

This table reports, by vintage year, average actual PMEs for Burgiss and Robinson-Sensoy and implied PMEs for Venture Economics, Preqin and Cambridge Associates. The implied PMEs use the results of vintage year regressions of PMEs on IRRs and Multiples from Burgiss data which are reported in Internet Appendix Table IA.V. Weighted averages use as weights fund capital commitments, as a proportion of total commitments for funds reporting performance data, in each vintage. Capital commitments at the fund level are not reported by Cambridge Associates.

Panel A: Buyout Funds

Vintage	Weighted Average				Unweighted Average			
	Actual PME Burgiss	Actual PME Robinson-Sensoy	Implied PME Venture Economics	Implied PME Preqin	Actual PME Burgiss	Implied PME Venture Economics	Implied PME Preqin	Implied PME Cambridge Associates
1984	1.09	1.56			0.87			
1985	0.91	1.27			0.91			
1986	1.11	0.93			1.00			
1987	1.20	1.28			1.25			
1988	1.13	0.77			0.98			
1989	1.22	1.15			1.26			
1990	2.34	1.35			1.57			
1991	1.32	0.84			1.23			
1992	0.89	1.31			0.79			
1993	1.24	1.49	1 07	1.16	1.35	1.02	1.17	1.06
1994	1.75	1.28	0.91	1.14	1.48	0.91	1.10	0.89
1995	1.20	1.33	1.00	1.16	1.34	1.04	1.23	1.26
1996	0 90	1 07	1.08	1.27	1.13	1.15	1.56	1.19
1997	1.30	1.41	1.23	1.22	1.23	1.03	1.25	1.21
1998	1.21	1.25	1.04	1.18	1.35	1.21	1.37	1.61
1999	1.27	1.20	1.42	1.30	1.19	1.23	1.31	1.56
2000	1.47	1.14	1.31	1.52	1.42	1.25	1 55	1.41
2001	1 38	1 03	1.15	1.78	1.31	1.16	1.62	1.65
2002	1 53	1.25	1.25	1.43	1.42	1.15	1.30	1.45
2003	1.58	1.43	1 46	1.71	1.75	1 21	1.43	1.38
2004	1 51	1 04	1.31	1.42	1.40	1 28	1.39	1.33
2005	1.23	1.04	1.04	1.16	1 20	1.07	1 21	1.20
2006	0.99		0.89	1 02	1 03	0.98	1.05	1.12
2007	1.02		0.98	1.00	1.03	1.06	1.08	1.03
2008	0.90		0.87	0.92	0.91	0.93	0.95	0.88
Average 2000s	*1.29*	*1.16*	*1.14*	*1.33*	*1.27*	*1.12*	*1.29*	*1.27*
Average 1993-99	*1.27*	*1.29*	*1.11*	*1.21*	*1.30*	*1.08*	*1.29*	*1.25*

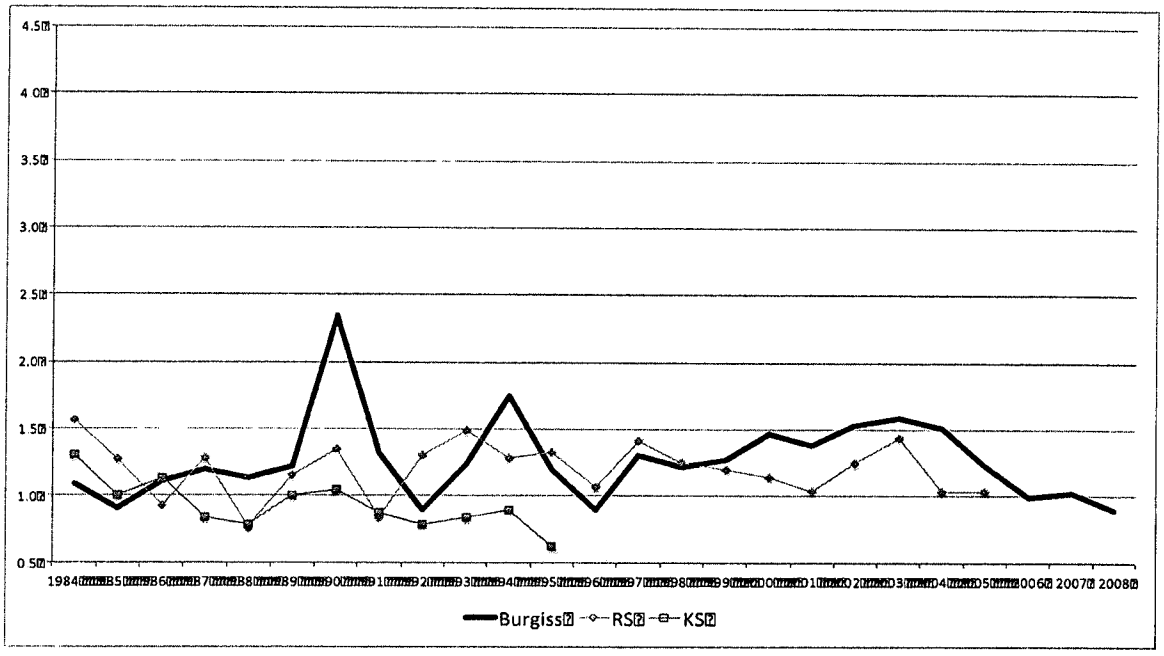
Panel B: Venture Capital Funds

Vintage	Weighted Average				Unweighted Average			
	Actual PME Burgiss	Actual PME Robinson-Sensoy	Implied PME Venture Economics	Implied PME Preqin	Actual PME Burgiss	Implied PME Venture Economics	Implied PME Preqin	Implied PME Cambridge Associates
1984	0.69	0.78			0.70			
1985	0.73	0.92			0.71			
1986	0.80	0.78			0.75			
1987	1.29	0.73			1 18			
1988	1.44	1.02			1.18			
1989	1.52	1.17			1.34			
1990	1.66	1.01			1.50			
1991	1.35				1.37			
1992	1.34	0.84			1.27			
1993	2.74	1.19	1 51	1 76	2 79	1.30	1.70	1.58
1994	2.86	1.87	2 18	3.14	2.40	1.53	2.08	1.80
1995	2.09	1.22	2.47	3.52	2.16	2.24	2.82	2.97
1996	4 17	1 27	3.21	1.75	3.79	3.25	2.44	3.09
1997	2.65	1.8	1 92	2.28	2.43	2.01	2.09	2.04
1998	1.48	1.54	1 61	1.64	1.43	1.55	1.58	1.40
1999	0.90	0.61	0.69	0.81	0.76	0.79	0.87	0.88
2000	0.85	0.71	0.92	0.90	0.79	0.82	0.98	0.78
2001	0.84	0.67	1 00	0.99	0.80	0.92	0.89	0.90
2002	0.88	0.85	0.80	0.91	0.82	0.81	0.80	0.87
2003	0.99		1.03	0.95	0.88	1.00	0 90	0.96
2004	0.96		0.97	1.06	0.90	0.94	1.07	1.19
2005	1.23	0.8	1.07	1.03	1.27	1.05	0.96	0.98
2006	0.97		0.93	0.97	0.93	0.86	0.94	0.95
2007	0.99		0 93	0.96	0.97	0.96	1.04	1.12
2008	0.84		0.85	0.89	0 84	0.78	0 84	0.90
Average 2000s	*0.95*		*0.94*	*0.96*	*0.91*	*0.90*	*0.94*	*0.96*
Average 1993-99	*2.41*	*1.36*	*1.94*	*2.13*	*2.25*	*1.81*	*1.94*	*1.96*

Figure 1
Buyout and VC fund PMEs

This figure shows average Public Market Equivalent ratios (PMEs) by vintage year, comparing private equity returns to equivalently timed investments in the S&P 500. Panel A focuses on buyout funds, and Panel B on venture capital, using the classifications used by the suppliers or authors. Only funds with a North American geographical focus are included.

Panel A: Buyout fund PMEs from various sources



Panel B: VC fund PMEs from various sources

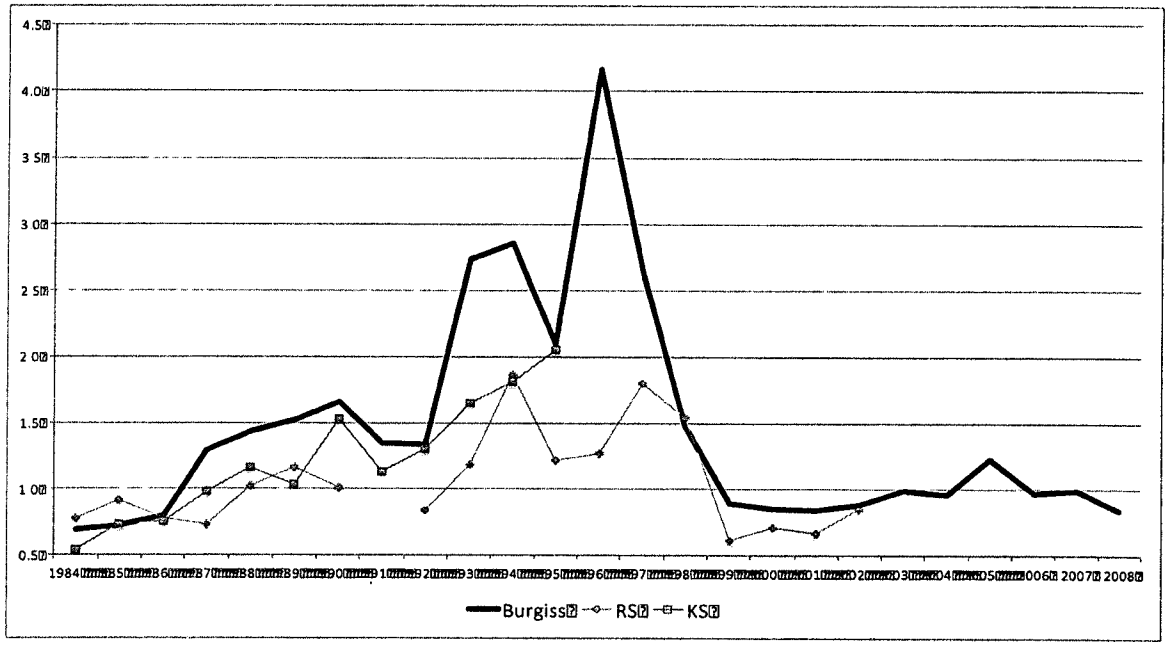
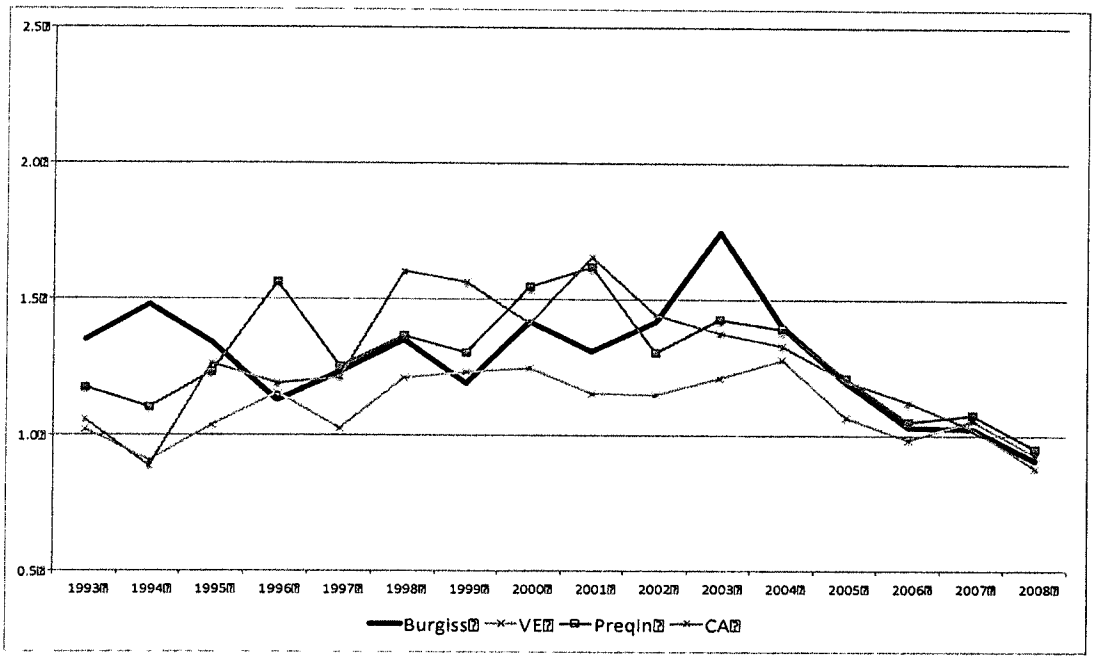


Figure 2
Actual and estimated PMEs

This figure shows, by vintage year, average Public Market Equivalent ratios (PMEs) from different commercial data sets. PMEs for Burgiss are calculated using underlying cash flow data for funds. PMEs for Venture Economics, Preqin and Cambridge Associates, are the PMEs implied by using regressions results as reported in Table VIII. Panel A focuses on buyout funds, and Panel B on venture capital, using the classifications used by the suppliers or authors. Only funds with a North American geographical focus are included.

Panel A: Buyout fund PMEs



Panel B: VC fund PMEs

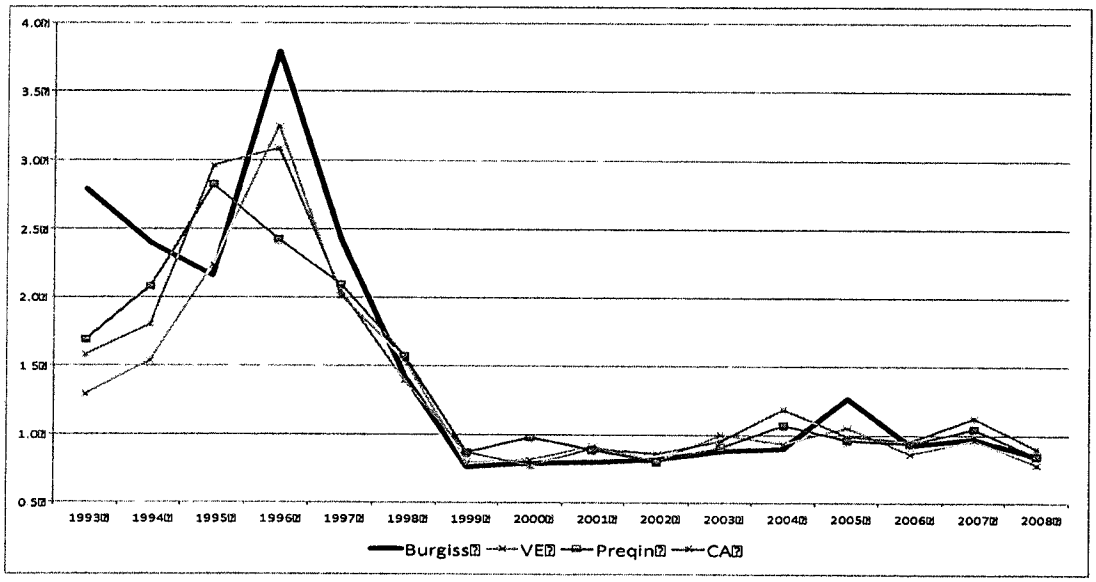


EXHIBIT QVLP-GS-8

IBISWorld

HERE KNOWLEDGE IS POWER

lowing water: The industry will consolidate, olstering operating efficiency and revenue growth

BISWorld Industry Report 22131

Vater Supply & Irrigation ystems in the US

cember 2015

Darryle Ulama

About this Industry

Industry Definition

Establishments in this industry operate water treatment plants and water supply systems. Infrastructure overseen by industry operators include, pumping stations, aqueducts and distribution mains. While the vast majority of industry operators are government entities, private companies are becoming increasingly prevalent within the industry. Only those irrigation systems supplied by public water supply systems are accounted for in this report, a small share of national irrigation activity.

Main Activities

The primary activities of this industry are
Operating water-treatment plants
Operating water pumping stations
Operating aqueducts
Operating water distribution mains

The major products and services in this industry are
Irrigation
Water supply from the Southeast
Water supply from the Southwest
Water supply from the West
Water supply from other regions
Other

Similar Industries

22112 Electric Power Transmission in the US
Establishments in this industry supply customers with electricity, another public utility.

22121 Natural Gas Distribution in the US
Establishments in this industry supply customers with natural gas, another public utility.

22132 Sewage Treatment Facilities in the US
Establishments in this industry provide both water supply and sewerage treatment facilities.

22133 Steam & Air-Conditioning Supply in the US
Establishments in this industry supply customers with steam for heat and air-conditioning, public utilities.

About this Industry

Additional Resources

For additional information on this industry

water.epa.gov
Environmental Protection Agency

www.globalwaterforum.org
Global Water Forum

www.usgs.gov/water
US Geological Survey

www.sec.gov
US Securities and Exchange Commission

Industry at a Glance

Water Supply & Irrigation Systems in 2015

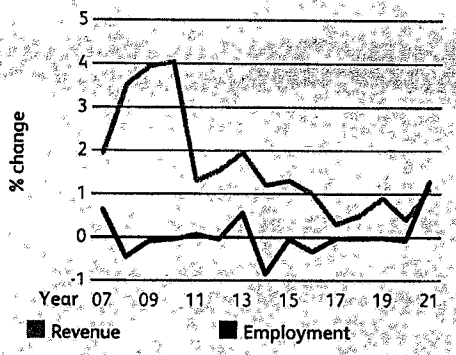
Key Statistics Snapshot

Revenue	Annual Growth 10-15	Annual Growth 15-20
$69.2bn	1.5%	0.6%
Profit	**Wages**	**Businesses**
$10.0bn	$11.3bn	3,028

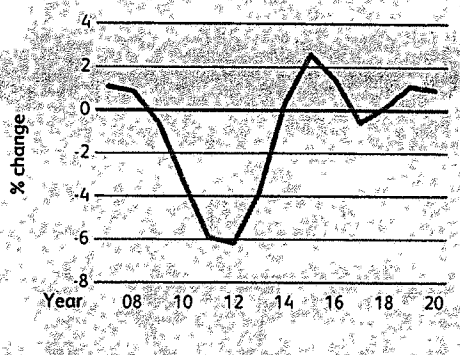
Market Share
American Water Works Company Inc.
4.5%
p. 23

Key External Drivers
Local and state government investment
Number of households
Average annual precipitation
Agricultural price index
p. 5

Revenue vs. employment growth

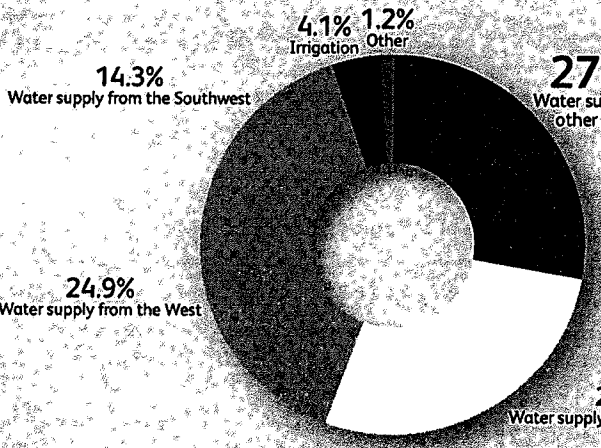


Local and state government investment



SOURCE: WWW.IBISWORLD.COM

Products and services segmentation (2015)



SOURCE: WWW.IBISWORLD.COM

Industry Structure

Life Cycle Stage	Mature	Regulation Level	Heavy
Revenue Volatility	Low	Technology Change	Low
Capital Intensity	High	Barriers to Entry	High
Industry Assistance	High	Industry Globalization	Low
Concentration Level	Low	Competition Level	Low

FOR ADDITIONAL STATISTICS AND TIME SERIES SEE THE APPENDIX ON PAGE 30

Industry Performance

Executive Summary | Key External Drivers | Current Performance
Industry Outlook | Life Cycle Stage

Executive Summary

The Water Supply and Irrigation Systems industry has performed well over the past five years. Population growth, as well as greater incidences of drought and other adverse weather conditions, has increased demand for water supplied by industry operators. Additionally, economic growth has expanded water demand from both downstream commercial and industrial customers. Increased business activity has increased the amount of water demanded from retailers, restaurants and other commercial customers for provision to their customers and employees. Growth in manufacturing and other industrial activities, which often use copious amounts of water, have expanded water demand from the industrial sector. This growth in demand, in line with droughts and other threats to supply, has prompted many public utilities commissions to increase water rates to curb overconsumption, further bolstering industry revenue. Finally, the industry has consolidated over the past five years as private companies increasingly purchased the rights to operate public water utilities and larger public utilities acquired smaller, less efficient distribution systems. As a result of these trends, both industry revenue and profit have risen in recent years. IBISWorld consequently forecasts that industry revenue will grow at an annualized rate of 1.5% over the five years to 2015, with including an estimated rise of 1.3% in 2015, totaling $69.2 billion.

Economic growth has expanded water demand from downstream and industrial customers

The Water Supply and Irrigation Systems industry is expected to grow more slowly over the five years to 2020. Per capita water consumption is forecast to decline, as increasing concerns regarding water conservation drive policy aimed at reducing consumption. However, while per capita consumption rates are expected to decline, aggregate water consumption is forecast to expand as the population and economy grow. Finally, this industry is anticipated to continue to consolidate as larger public and private companies continue to acquire smaller underperforming water supply systems, bolstering operating efficiency and revenue growth. Consequently, both industry revenue and profit are expected to rise in upcoming years. Overall, IBISWorld expects industry revenue to grow at an annualized rate of 0.6% over the five years to 2020, totaling $71.3 billion.

Key External Drivers

Local and state government investment
Local and state governments are responsible for the lion's share of investment in national water supply systems. Increased local and state government investment in water supply infrastructure expands industry operating capacity by increasing the volume of water that can be distributed through industry distribution systems and extending distribution systems to reach a larger downstream market of customers. Local and state government investment is expected to increase in 2015, representing a potential opportunity for the industry.

Number of households
Households represent the largest source of revenue for the Water Supply and Irrigation Systems industry. As the number of households rises, so does demand for water from residential customers, benefiting industry operators.

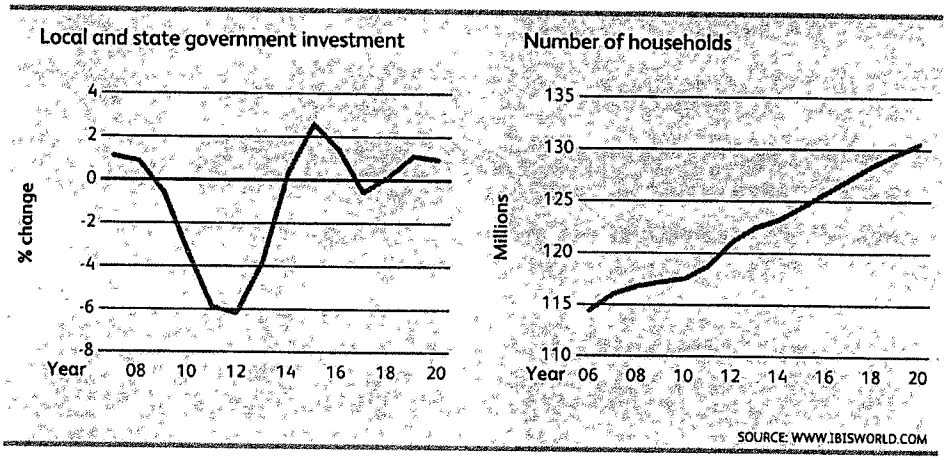
Industry Performance

Key External Drivers continued

The number of households is expected to expand in 2015.

Average annual precipitation
Demand for water from public water supply systems tends to increase during periods of low precipitation, boosting industry sales. However, regulators often impose water rationing during periods of drought, reducing the volume of industry water sales to the detriment of industry revenue growth. As a result of these competing trends, increased precipitation tends to have a positive overall effect on industry revenue growth. Average annual precipitation is forecast to decline in 2015, representing a potential threat to the industry.

Agricultural price index
The majority of water supplied for irrigation is not sourced from public water supply systems. However, an estimated 4.1% of industry revenue is generated from sales of water for the purpose of irrigation. As the price of agricultural products rises, farmers tend to demand more water for irrigation, which benefits industry operators. The agricultural price index is anticipated to decline in 2015.

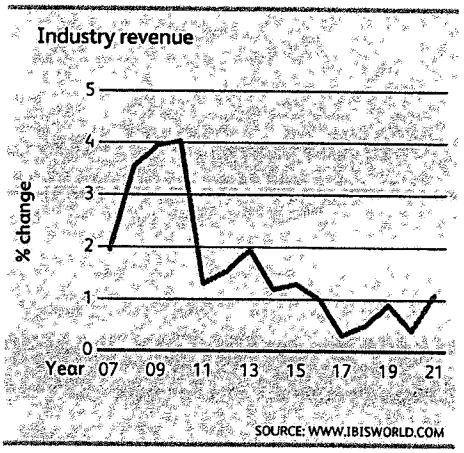


Industry Performance

Current Performance

Companies in the Water Supply and Irrigation Systems industry sell water as a public utility to households, businesses and public entities throughout the United States. Industry companies operate water treatment plants and infrastructure within water supply systems, including pumping stations, aqueducts and distribution mains. According to estimates from the Environmental Protection Agency (EPA), about 84.0% of water supply operators are government owned and the remaining operators are private entities. The industry does not include sewage treatment facilities.

Revenue for the Water Supply and Irrigation Systems is forecast to increase at an annualized rate of 1.5% over the five years to 2015, with expected growth of 1.3% in 2015, totaling $69.2 billion. This rise has been driven by an expansion in the volume of water sold, as well as water price hikes. These rate jumps have been implemented due to higher water demand resulting from droughts and drier weather conditions. In more serious cases, government agencies have implemented mandatory price rises to encourage conservation, such as the 25.0% rate set to take effect in June 2015 in California. Each state's public utilities commission sets its water rates. Utilities regulators



that set prices within their jurisdictions, as well as municipal utilities commissions, are together referred to as PUCs. PUCs set water price rates based on a variety of factors, including the volume of water in demand over a certain period of time and the amount of revenue needed to pay for capital investments used in the maintenance and upgrading of the water supply infrastructure. Many PUCs granted rate increases over the past five years, allowing industry operators to charge downstream consumers higher prices for the water they sell, driving industry growth over the period.

Growth in water demand

Following a slight downturn in the aftermath of the recession, water demand from both households and businesses has grown over the past five years. Aggregate household demand for water across the country has grown primarily due to population growth, as well as the increased prevalence of droughts and other adverse weather conditions that have strained the quantity of water available. Additionally, economic growth has increased the amount of water demanded by both commercial and industrial customers. As the number of customers patronizing retail outlets and restaurants has increased, these businesses have demanded more water to provide for both their employees and customers. Industrial businesses often use large quantities of water in their operations. For example, large quantities of water are used in the production of steel. As manufacturing and other industrial activity have expanded, demand for water from these customers has risen strongly as well. Finally, while only a fraction of the water used in irrigation is sourced from public water utilities, increased agricultural activity, driven by growth in crop prices, has nonetheless expanded demand from farmers for the water provided by industry operators.

Industry Performance

Growth in water demand continued

Water must be thoroughly treated prior to being distributed through public water utilities systems. As a result, water treatment costs have expanded over the past five years as downstream demand for water has increased. To cover these costs, many industry operators have successfully applied for water rate price increases from PUCs, further boosting industry revenue.

Privatization and consolidation

Public water-supply entities have increasingly become privatized over the past five years. Driven by low tax revenue in the aftermath of the recession, many municipal water authorities have opted to outsource the provision of water utilities within their jurisdictions to cushion their struggling budgets. At the same time, many smaller water distribution utilities have been merged into larger systems over the past five years in an attempt to improve the overall efficiency of water distribution over a geographic area.

These trends have been accompanied by an increase in the number of mergers and acquisitions (M&A) in the industry, as private-sector companies and larger public water utilities entities gain control over smaller underperforming water supply and irrigation operations to take advantage of economies of scale. For example, American Water, the industry's largest player, acquired 11 regulated water systems and 48 wastewater systems in May 2011. In line with this M&A activity, the number of entities operating in the industry is anticipated to fall at an annualized rate of 0.2% over the five years to 2015 to 3,028 enterprises. Industry employment has also fallen as workforces have been trimmed in line with this M&A activity, and the number of industry employees forecast to decline at an annualized rate of 0.1% over the same period, totaling 199,422 total workers.

Public water-supply entities have increasingly become privatized over the past five years

Despite this consolidation, the Water Supply and Irrigation Systems industry is still highly fragmented. While some water utilities systems encompass enormous populations, such as that of New York City, there remain thousands of systems serving fewer than 100 people. In addition, while the operation of water supply systems is increasingly being outsourced to larger private companies, many of these companies are small themselves, as the vast majority of water supply systems are still operated by local public entities.

Profit growth

The privatization of water supply infrastructure and the general consolidation of the industry have had an overall positive effect on industry profit margins. With interest rates remaining low, private companies have been able to purchase underperforming businesses by borrowing at favorable rates. For those companies that have signed contracts that grant incentives to invest in the infrastructure they operate, whether via mandate or medium-term ownership rates, investment in existing infrastructure has increased in an attempt to improve distribution efficiency to the benefit of industry margins. The integration of smaller water systems into larger ones has also had a positive effect on margins by reducing overall infrastructure requirements.

Industry Performance

Industry Outlook

Growing concern over the conservation of water is anticipated to drive policy aimed at the reduction of water usage, reducing per capita demand for water supplied by industry operators. However, economic and population growth are nonetheless forecast to increase the aggregate volume of water consumed by households, businesses and public entities in upcoming years. Additionally, the raising of water prices is expected to make up an important part of policies aimed at reducing per capita water consumption, benefiting overall industry revenue levels. As a result, industry revenue is expected to grow at an annualized rate of 0.6% over the five years to 2020, totaling $71.3 billion.

Rate increases

Per capita water consumption is expected to decrease as a result of water conservation measures in upcoming years, to the detriment of industry revenue growth. However, rate increases are anticipated to more than offset this expected decline. The investment required to maintain the nation's water-supply system will necessitate increased prices charged to the industry's downstream customers. Public utilities commissions (PUCs) are expected to increasingly approve these rate increases, as increased municipal and local tax revenue collection increases the ability of government entities to co-fund infrastructure improvements.

In line with these expected trends, the Environmental Protection Agency (EPA) estimates that $335.0 billion will be invested in the replacement of aging infrastructure between 2007 and 2026.

Per capita water consumption is expected to decrease as a result of conservation measures

As the privatization of water utilities becomes more common, private companies are expected to be responsible for a growing share of this investment. Finally, many PUCs will implement measures that base rate approval on the previous year's revenue, as opposed to the currently prevalent practice of basing rates on the volume of water distributed to downstream customers. This strategy better ensures the long-term growth prospects for water utilities operators, further incentivizing investment in infrastructure.

Industry consolidation

The increasing trend of mergers and acquisitions in the industry over the previous five years is expected to continue over the five years to 2020. Consolidation offers multiple benefits to operating efficiency. These benefits include the development of technological expertise that would not be feasible in a smaller organization, improved capacity to meet increasingly stringent environmental regulations and an enhanced ability to fund necessary capital investment.

Larger utilities that have greater access to capital are generally more capable of making mandated and other necessary infrastructure upgrades to water and wastewater systems. In addition, water and wastewater utilities with large customer segments spread across broad geographic regions may more easily absorb the risk of adverse weather, such as droughts, excessive rain and cool temperatures in specific areas. Larger utilities also have cost advantages because they can spread

Industry Performance

Industry consolidation continued

overhead expenses over a larger customer base, reducing the costs to serve each customer. Many administrative and support activities can be efficiently centralized to gain economies of scale and streamline the implementation of regulatory guidelines. Companies that participate in industry consolidation have the potential to improve operating efficiencies, lower unit costs and improve service. As a result of these benefits, large public water utilities systems and private companies are expected to expand their market share by acquiring smaller underperforming water supply systems. The efficiency benefits of the industry's consolidation are forecast to have a positive influence on industry profit margins.

As a result of this expected M&A activity, the number of enterprises operating in the industry is expected to decline at an annualized rate of 0.2% over the five years to 2020, totaling 3,004. In line with this decline in the number of industry enterprises, the number of employees is also forecast to fall at an annualized rate of 0.1% over the five years to 2020 to 198,432 workers.

Industry Performance

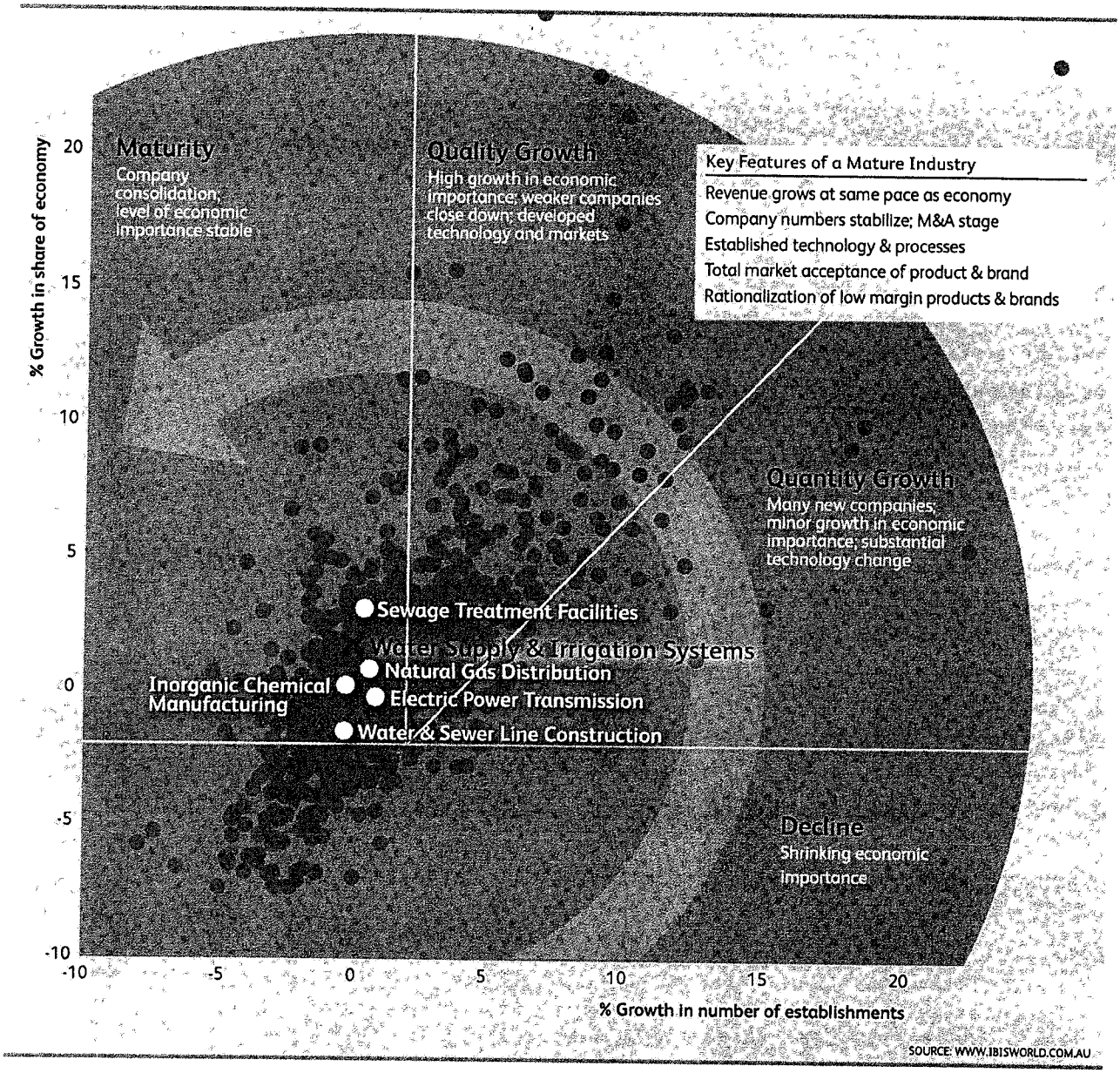
Life Cycle Stage

Industry services are essential to the functioning of the US economy

IVA is expected to grow in line with US GDP growth

The industry is undergoing structural change

The industry is experiencing merger and acquisition activity



Industry Performance

Industry Life Cycle

This Industry is Mature

The Water Supply and Irrigation Systems industry is in the mature stage of its life cycle. Industry value added (IVA), a measure of an industry's contribution to the overall economy, is forecast to grow at an annualized rate of 2.1% over the ten years to 2020. In comparison, US GDP is anticipated to grow at an annualized rate of 2.2% over the same period of time. IVA growth in line with that of GDP is a typical indicator of an industry in the mature stage of its life cycle.

A properly functioning public water supply system is absolutely critical to the functioning of any modern economy. As a result, public funding for water treatment and distribution infrastructure has long been high in order to satisfy the requirements of the US population and economy. While funding can vary year-over-year, the Water Supply and Irrigation Systems industry grows in line with population and economic growth over the medium- and long-term.

The technology used in the distribution of water has not changed dramatically over the past 10 years. However, there have been some changes in the way in which water is treated, as well as recycled. These changes have come about partially as a result of increased regulation by the Environmental Protection Agency (EPA). With increased industry regulation expected, innovations in industry operations are likely to develop in upcoming years.

Finally, while not fundamentally altering the nature of industry activities, the Water Supply and Irrigation Systems industry has been undergoing structural change in recent years in the forms of increased privatization of public water systems, as well as the consolidation of smaller systems into larger ones. While the vast majority of water systems are still owned and operated by public entities, municipalities are increasingly contracting out private operators to provide public water distribution services within their jurisdictions. In addition, smaller water distribution systems, such as those that serve small rural communities, are increasingly being integrated into larger systems.

Products & Markets

Supply Chain | Products & Services | Demand Determinants
Major Markets | International Trade | Business Locations

Supply Chain

KEY BUYING INDUSTRIES

31-33	**Manufacturing in the US** Manufacturers and other industrial companies make heavy use of water from public utilities in their operations.
42	**Wholesale Trade in the US** Commercial businesses purchase water from public utilities for use in their operations.
44-45	**Retail Trade in the US** Commercial businesses purchase water from public utilities for use in their operations.
92	**Public Administration in the US** Government entities use water sourced from public utilities for use in their day-to-day operations.
99	**Consumers in the US** Households represent the most important market for the Water Supply and Irrigation Systems industry.

KEY SELLING INDUSTRIES

22112	**Electric Power Transmission in the US** Electric power is essential in the operation of machinery and equipment used in water treatment plants and water supply systems.
23711	**Water & Sewer Line Construction in the US** This industry does construction and repair work on the pipelines and other water supply infrastructure operated by the Water Supply and Irrigation Systems industry.
32518	**Inorganic Chemical Manufacturing in the US** This industry provides industry operators with chemicals used in water purification.
42469	**Chemical Wholesaling in the US** This industry provides industry operators with chemicals used in water purification.

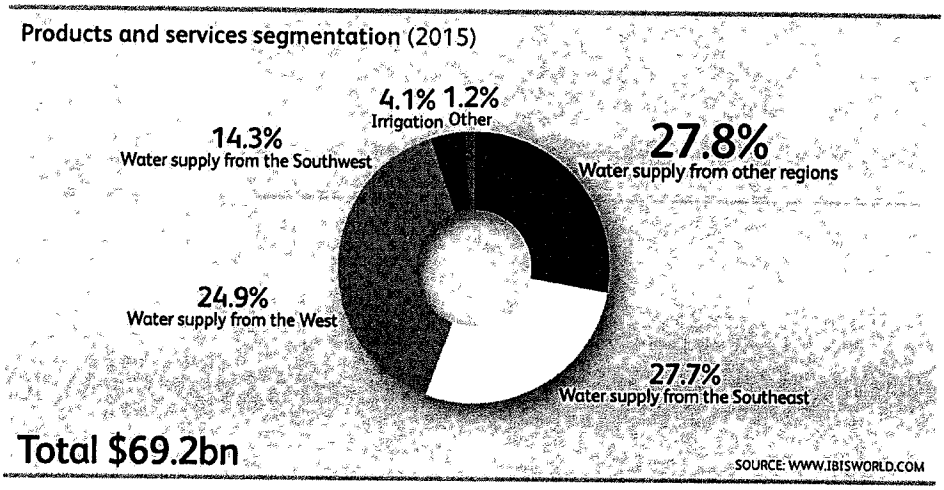
Products & Services

Water supply
The main service offered by this industry is the supply of water through the operation of public water supply systems, which generates almost 95.0% of overall industry revenue. Water-supply firms locate near key markets and supply water to their customers. As such, the location of large water-supply services follows population patterns and firms set up shop near large groups of people. Climatic conditions also play a role in location, and firms gravitate to abundant sources of water. This segment has grown over the past five years as rate increases have been passed down to the customer as higher volumes of water were demanded (as a result of droughts and other adverse climate conditions) and private-sector firms became more efficient in their operations.

Other
Charges for irrigation account for an estimated 4.1% of revenue and other items for the remaining 1.2%. These contributions to overall industry revenue generation have remained relatively constant over the course of the past five years. Although large volumes of water are used for irrigation in the United States, most is withdrawn directly by end-users (farmers raising crops of various types) and is not provided via the public supply system. These

Products & Markets

Products & Services continued



withdrawals of water, and payment for them (generally via licenses), do not form part of this industry's operations. Instead, they comprise part of the revenue earned by state and local governments from natural resources.

Demand Determinants

Industry demand is determined by overall water demand, as well as the supply of water available to downstream markets from outside of public water supply systems (i.e. from outside the industry). Overall water demand is, in turn, dependent on the size of the population, the price of water, weather conditions, the amount of agricultural and industrial activity and other related factors. The supply of water available from outside the Water Supply and Irrigation Systems industry is mostly linked to infrastructure. For example, most of the water used in irrigation is sourced from separate water distribution systems.

Households, which represent the Water Supply and Irrigation Systems industry's largest market, demand water for drinking, bathing, laundry use, cleaning, gardening and other miscellaneous uses. The most important factor in demand from this market is the size of the US population. In addition however, demand from this market is also dependent on factors such as water prices, the type of household, weather conditions and water use trends. In general, households tend to decrease their water demand when prices rise. In addition, those living in apartments usually consume less water than those households with large properties, where water is used for a wider variety of purposes, most importantly in the maintenance of lawns and gardens. Households are also more likely to use more water in arid climates, where there is less rainfall. Finally, water demand can be influenced by public advocacy campaigns to reduce water consumption and technologies such as low flush toilets.

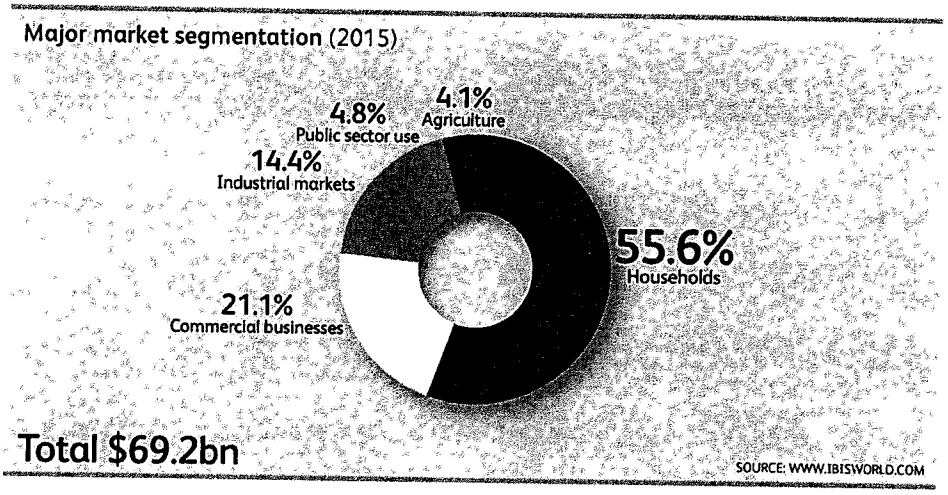
Industry demand is also influenced by commercial, public sector and industrial demand for water. Retail outlets, offices, hotels and motels, car washes, restaurants, and public buildings all make heavy use of water both to serve their customers and employees and sometimes as an input in their operations. As with the residential sector, demand for water from public and commercial customers is correlated with

Products & Markets

Demand Determinants continued

population growth, weather conditions and trends in water use. In addition, commercial businesses tend to increase their demand for water when business increases, as more customers and employees drink tap water, use restrooms and more services are provided that make use of water (i.e. car washes). Finally, manufacturing and other industrial customers demand water for use in their operations, often as an input or a coolant. For example, steel manufacturing requires substantial water in the cooling of coke.

Major Markets



Households

Households represent the largest market for the Water Supply and Irrigation Systems industry, with sales to this market expected to generate 55.6% of industry revenue in 2015. Households make heavy use of water for consumption, bathing, lawn maintenance, laundry use and other less common uses. Household water consumption has risen in absolute terms over the past five years in line with the growth of the US population. The amount of revenue generated from this segment however, can vary somewhat significantly year-over-year in line with weather conditions, especially droughts, and the various water price rates that regulatory agencies set across the country. Revenue generated from sales to this market segment has however, declined as a share of overall industry revenue as sales to commercial and industrial customers has increased.

Commercial businesses

Commercial businesses purchase water from the public supply for use in their restrooms, as well as to a lesser extent in their operations; for example, restaurants may use significant volumes of water while cooking and through offering customers tap water to drink. Sales of water to commercial businesses are expected to generate 21.1% of industry revenue in 2015, a share that has risen over the past five years as increased commercial business activity has increased water consumption from this market at a faster rate than households.

Industrial markets

Industrial customers can, depending on the type of customer, use very large

Products & Markets

Major Markets continued

quantities of water. Like commercial businesses, industrial customers use water from the public distribution system to give to their workers to drink and for use in their on-site restrooms. Additionally however, some manufacturers and other industrial customers use very large quantities of water in their operations. For example, large amounts of water are required to cool coke, a carbon fuel that is essential in the manufacturing of steel. As manufacturing and industrial activity has expanded over the past five years, demand for water from this segment has grown as well, increasing the share of revenue generated from sales to industrial markets.

Other markets

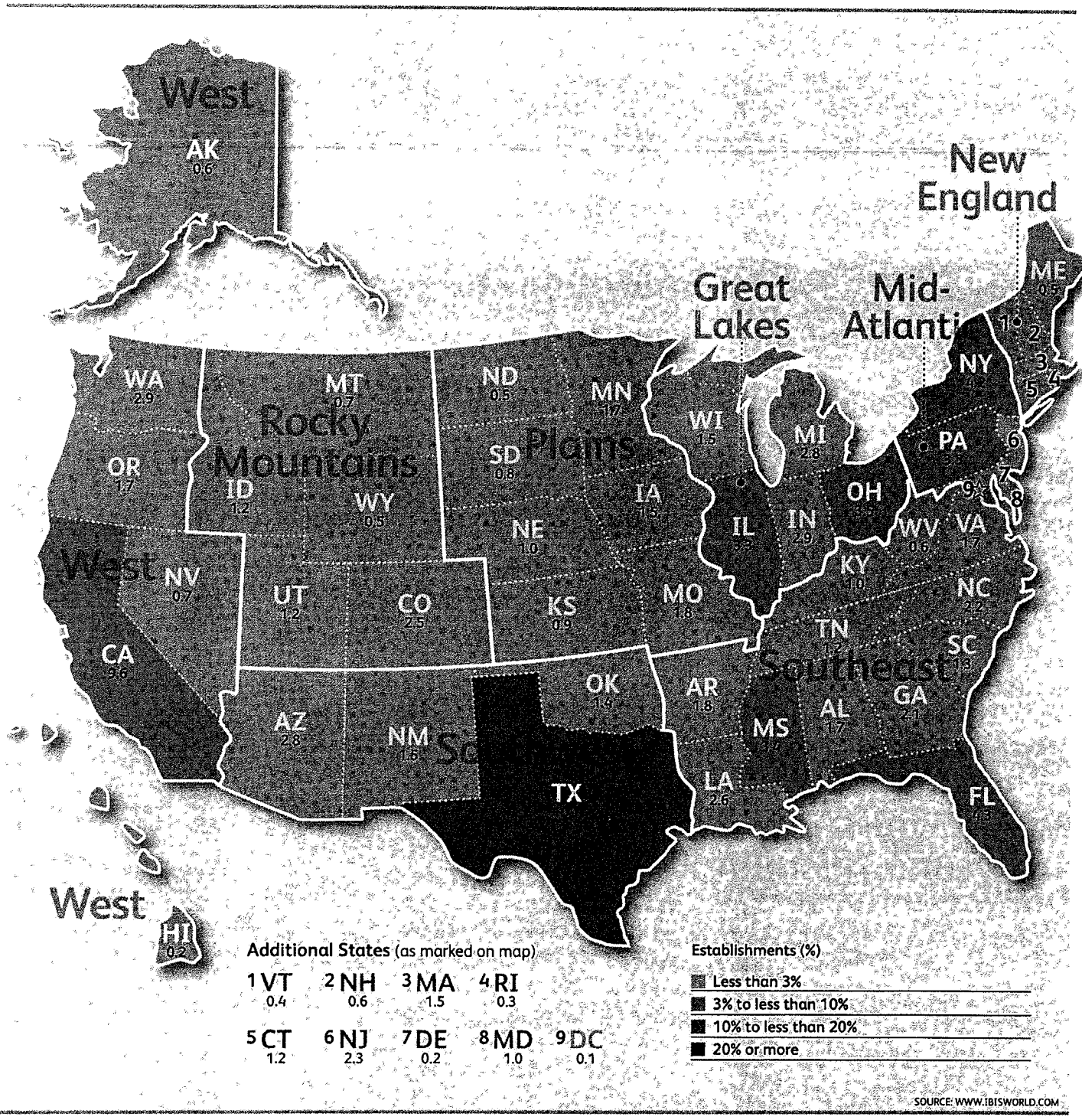
An estimated 4.8% of industry revenue is generated through the provision of water to the public sector. This includes sales of water used in government offices and buildings, as well sales of water for use by firefighting services, for the watering of public gardens and parks and other miscellaneous uses. Additionally, an estimated 4.1% of industry revenue is generated through water sales to farmers for use in irrigation. Revenue generated from sales to these markets has remained relatively stable as a share of overall industry revenue over the past five years.

International Trade

The Water Supply and Irrigation Systems industry operates almost entirely within the borders of the United States. Some water supply systems may distribute water across the border into Mexico and Canada, and Mexican and Canadian water distribution entities may provide services to some customers in the United States. However, such activity represents an infinitesimal share of overall industry revenue generation.

Products & Markets

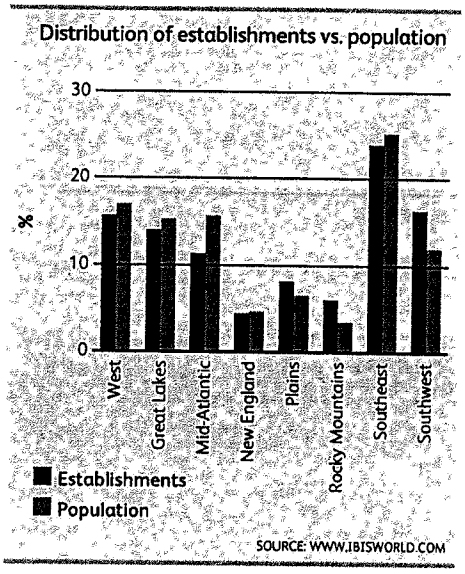
Business Locations 2015



Products & Markets

Business Locations

In general, water use in the United States reflects population densities, although climatic conditions also play a role. The Southeast accounts for the largest share of public supply water use in the country, followed by the Southwest and West, all regions with relatively large populations and hotter climates. Both the Southeast and West contain a slightly smaller share of industry establishments than their share of the overall US population would otherwise suggest. Conversely, the Southwest contains a much larger share of industry establishments than its population would imply. This is primarily due to the region's very hot and dry conditions. In order to maintain lawns, gardens, golf courses and other plots of vegetation, households and businesses in the Southwest must extract large quantities of water from the water distribution system. Conversely, in regions such as the Great Lakes, New England, Mid-Atlantic and other regions, water use is lower per-capita, as regular rainfall is able to satisfy a larger share of the population's needs.



Like the Southwest, the Plains and Rocky Mountains regions also contain a greater share of industry establishments than their share of the US population would indicate due to comparatively lower levels of rainfall in these regions.

Competitive Landscape

Market Share Concentration | Key Success Factors | Cost Structure Benchmarks
Basis of Competition | Barriers to Entry | Industry Globalization

Market Share Concentration

Level
Concentration in this industry is Low

The Water Supply and Irrigation Systems industry has a low level of market share concentration. There are numerous government-owned and private-sector operators in the industry. Even the largest of the private-sector operator, American Water Works, is expected to account for less than 5.0% of total industry revenue. Likewise, the largest municipal water suppliers account for a similar market share. Most firms operate on a localized basis and serve water to a small segment of the population. Nonetheless, market share has increased over the past five years as private firms step up acquisition activity. These firms are seeking aging assets that have been neglected by public sector firms reeling from financing issues. These private firms are looking to expand their footprint in nearby areas where they can add value and make operations that were once struggling into profitable ventures.

Key Success Factors

IBISWorld identifies 250 Key Success Factors for a business. The most important for this industry are:

Optimum capacity utilization
High capacity utilization enables unit capital charges to be reduced.

Ability to pass on cost increases
The ability to secure water price rate hikes from regulators with minimal lag following an increase in upstream purchases costs is crucial to maintaining margins.

Economies of scale
The efficiency of a water-supply system is significantly influenced by the size of the population and geographical area it serves.

Ensuring pricing policy is appropriate
The price charged for water has an impact on demand. Once basic needs are supplied (drinking and washing), the demand for water tends to fall as the price rises.

Cost Structure Benchmarks

Profit
Industry profit margins, defined as earnings before taxes and interest (EBIT), are expected to expand from an estimated 13.0% of industry revenue in 2010 to an anticipated 14.5% in 2015. Industry margins are grown primarily as a result of a combination of increasing water price rate hikes and the industry's increasing consolidation. Water price hikes have directly positively impacted industry margins by increasing the price of industry output relative to input costs. Consolidation has further expanded margins as less-efficient, smaller water supply operators have been replaced by more efficiently run, larger public and privately owned utilities entities. As the industry continues to consolidate and as water prices continue to rise, industry profitability is expected to continue to rise.

Purchases
Purchases costs represent the Water Supply and Irrigation Systems industry's largest cost, and are expected to be equivalent to 21.8% of industry revenue in 2015. While including other purchases, purchased water and chemicals used in water purification and treatment represent the most significant purchases costs for industry operators. Purchased water is usually bought from reservoirs and other municipally owned sources of water. Purchases costs have remained relatively stable as a share of industry revenue over the past five years.

Wages
Wage costs represent the third highest cost to industry operators, and are expected to be equivalent to 16.4% of industry revenue in 2015. Relatively few permanent employees are needed to manage water treatment and

Competitive Landscape

Cost Structure Benchmarks continued

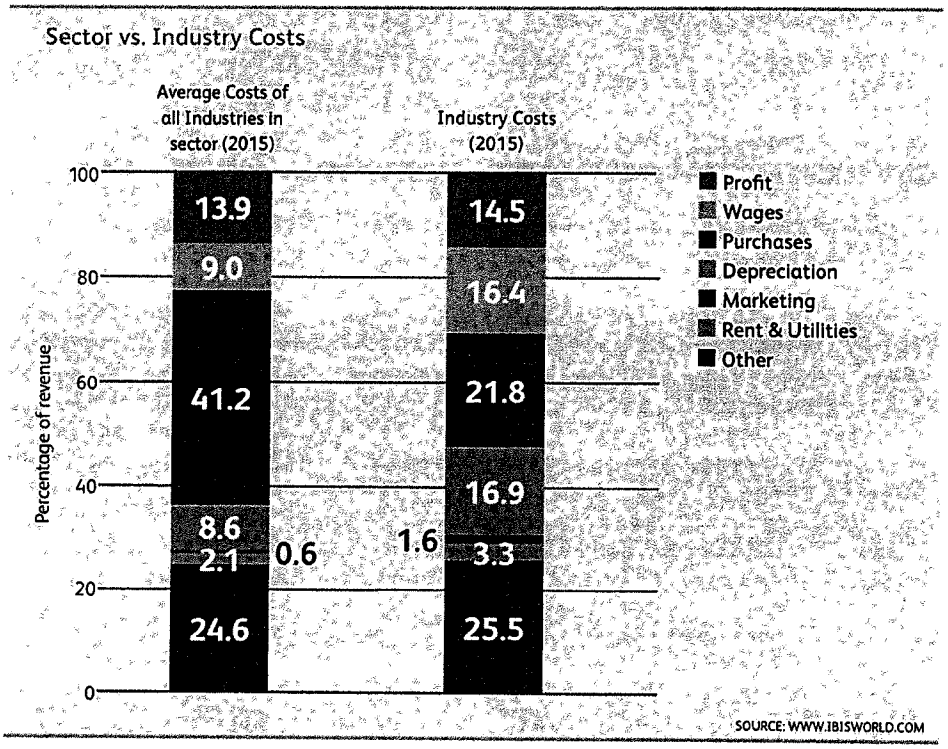
supply systems, with labor focused on monitoring treatment and distribution to ensure that water is being supplied safely and efficiently. However, the industry must regularly pay repair crews to carry out regular maintenance work on industry infrastructure. Additionally, permanent industry workers are mostly highly trained engineers that must do their jobs very methodically to prevent any catastrophic mistakes. As a result, industry wages tend to be relatively high. Wages have fallen somewhat as a share of industry revenue over the past five years as operational advancements, such as improved metering and electronic billing, have reduced industry labor intensity.

Depreciation

Depreciation costs for the Water Supply and Irrigation Systems industry are relatively high, equivalent to an estimated 16.9% of industry revenue. Given the critical nature of properly working water supply systems, substantial capital is invested in the repair and maintenance of water treatment plants, pumping stations, distribution lines and other industry infrastructure. Overall, industry depreciation costs have grown as a share of industry revenue over the past five years in line with increased investment in national water supply and distribution infrastructure.

Other

Other costs include administrative fees, legal costs and marketing costs, among other costs. Given that that majority of industry operators are public utilities that have monopoly control over the water infrastructure within the jurisdictions they operate, industry marketing costs are very low. Conversely, legal and administrative fees, especially for privately owned industry operators, can be quite high given the high level of industry regulation.



Competitive Landscape

Basis of Competition

Level & Trend
Competition in this industry is Low and the trend is Steady

Typically, water suppliers operate as single regional monopolies, with very little competition between suppliers. In order to compensate for this lack of competition and prevent the establishment of monopolistic pricing, regulatory authorities typically have a significant role in setting water price rates. In addition, regulators have significant oversight over industry operations to ensure that the water supply is supplied to an entire regional population, regardless of the implications for profitability. While the level of competition in this industry is very low, it is increasing as a greater share of public water utilities are becoming privatized. As municipalities increasingly privatize their water utilities, private companies are increasingly competing over contracts to gain control over these utilities. Nonetheless, the vast majority of water supply systems continue to be owned and operated by public companies.

Barriers to Entry

Level & Trend
Barriers to Entry in this industry are High and Decreasing

Barriers to entry into the Water Supply and Irrigation Systems industry are very high, primarily due to the extremely strict government regulations industry operators are exposed to and the very high level of capital investment required to operate water utilities. Finally, the vast majority of water supply systems are owned and operated by municipal government authorities. As a result, with the exception of setting up a new, small water supply system for an isolated population, prospective industry operators are only able to enter the industry when a municipal government decides to privatize its water supply system, a circumstance that, while not rare, does not occur at any regular interval. In order to secure a contract to operate a municipality's water supply system, a prospective operator must first meet all federal, state and local government inspections to ensure that the company is able to perform the job while strictly adhering to all safety, environmental and other regulations. Prospective operators then must also demonstrate that will be able to invest enough capital into existing infrastructure to ensure its proper functioning, as well as convince the government entity tendering the contract that they will do a better job at a lower price than any competitors. Competing with existing operators over a new contract tends to be particularly difficult, as existing operators have a proven history of expertise operating water utilities. All of the above mentioned factors demonstrate the very high barriers to entry into the Water Supply and Irrigation Systems industry.

Barriers to Entry checklist

Competition	Low
Concentration	Low
Life Cycle Stage	Mature
Capital Intensity	High
Technology Change	Low
Regulation & Policy	Heavy
Industry Assistance	High

SOURCE: WWW.IBISWORLD.COM

Competitive Landscape

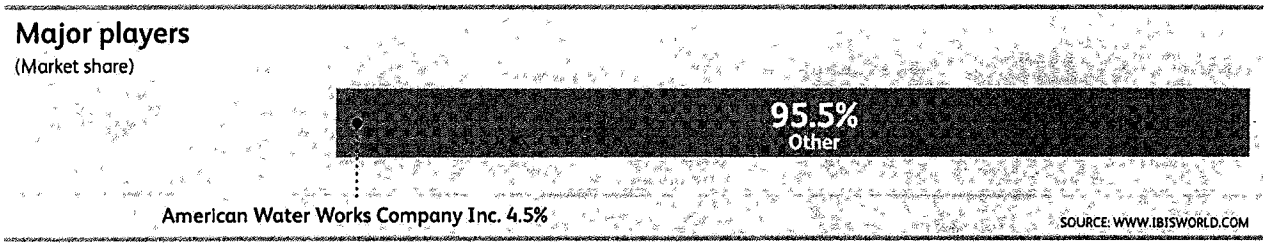
Industry Globalization

The Water Supply and Irrigation Systems industry has a very low level of globalization, with the vast majority of industry operations being conducted by municipal government entities at a local level. However, the level of industry globalization is increasing.

Foreign water firms are both acquiring water utilities (investor and municipally owned) in the United States and increasingly entering into public/ private partnerships with municipalities for the operation of their water systems.

Major Companies

American Water Works Company Inc. | Other Companies



Player Performance

American Water Works Company Inc.
Market share: 4.5%

American Water Works Company Inc. (AWW) provides water, wastewater and other related services to about 14.0 million people in 40 US states and two Canadian provinces. Its corporate headquarters are located in Voorhees Township, NJ. Until April 2008, AWW was a wholly owned subsidiary of RWE Aktiengesellschaft and Thames Water Aqua Holdings, the latter of which is the holding company for RWE's global water business. RWE, a global multiutility company operating in more than 120 countries, acquired AWW in January 2003. Following the acquisition, RWE combined AWW with the US operations of RWE Thames Water, making AWW the manager of RWE's entire water business in North America and Chile.

The company's regulated utilities segment is most relevant to this industry. AWW's regulated utilities supply about 1,500 communities in 16 states with about 350-billion gallons of water per year. Its unregulated or market-based businesses provide contract management for systems that serve another 5.0 million consumers in the United States and Canada and also provide system design and homeowner services. Market-based activities typically comprise meter reading, billing, leak detection, engineering services, water treatment services, water testing, recycled water operations and wastewater operations.

Financial performance

The company's industry-specific revenue is expected to grow at an annualized rate of 3.9% over the five years to 2015, totaling $3.1 billion. Revenue growth has come as a result of water price increases, growth in the volume of water supplied and a number of strategic acquisitions. AWW has positioned itself to acquire localized water service companies to

American Water Works Company Inc. - financial performance

Year	Revenue ($ million)	(% change)	Operating Income ($ million)	(% change)
2010	2,555.0	11.6	728.1	296.1
2011	2,666.2	4.4	803.1	10.3
2012	2,853.9	7.0	924.1	15.1
2013	2,878.9	0.9	948.3	2.6
2014	3,011.3	4.6	1,002.6	5.7
2015*	3,090.0	2.6	1,035.1	3.2

*Estimates

SOURCE: ANNUAL REPORT AND IBISWORLD

Major Companies

Player Performance continued

expand. Notable recent acquisitions include the 2011 purchase of 11 regulated water systems and 48 wastewater systems in Missouri, as well as the 2012 purchase of seven regulated water systems in New York, which added about 50,000 customers to the company's New York operations.

Additionally, company profitability has been very strong over the past five years. Before its parent company spun off AWW, contractual obligations prevented the company from filing rate increases for a specified period of time, which hampered profit. However, the company rebuilt its infrastructure and returned to profitability in 2010. Furthermore, the company has divested assets to pad profit margins. In January 2011, AWW sold water and wastewater operations in Arizona and New Mexico to EPCOR Water for a total of $470.0 million.

Other Companies

The Water Supply and Irrigation Systems industry is extremely fragmented. Most people get their water from community water systems, defined by the Environmental Protection Agency (EPA) as public water systems that supply water to the same population year-round. The systems range in size from large municipally owned systems, such as the New York City water system, which supplies water to about 9.0 million people, to small systems that serve only tens or hundreds of customers.

The EPA also tracks noncommunity water systems, which total about 100,000. These can include nontransient systems like factories, schools or office buildings and transient water systems like gas stations or campgrounds where customers do not remain for a long period of time. Since these systems, by EPA definition, do not operate year-round, IBISWorld does not include them as industry operators.

Aqua America

Estimated market share: 1.2%

Aqua America Inc. is the holding company for regulated water utilities that supply water or wastewater services to 3.0 million people in Pennsylvania, Ohio, Illinois, Texas, New Jersey, Indiana, Virginia, North Carolina and Georgia. In 2013, the company sold all five of its Florida operations to focus on its business in these eight states. Its largest operating subsidiary, Aqua Pennsylvania Inc. (formerly Pennsylvania Suburban Water Company), accounts for about 53.0% of the company's operating revenue and provides water or wastewater services to about 1.5 million people in the suburban areas north and west of Philadelphia and 25 other counties in Pennsylvania. Although the operations in Philadelphia remain the most substantial, the company's name changed to reflect the geographic broadening of operations that occurred over recent years.

Aqua America has its headquarters in Bryn Mawr, PA. Part of the company's growth strategy is to expand via acquisitions; in 2013 the company acquired 15 water and wastewater utility systems. Further, in 2012 the company significantly expanded its operations with the acquisition of American Water Works Company Inc.'s water operations in Ohio, adding about 59,000 customers. However, additions to its revenue are offset by the simultaneous sale of its water operations in New York, which served about 51,000 customers. In 2015, the company is expected to generate about $824.0 million in industry-related revenue.

Major Companies

Other Companies continued

California Water Service Group

Estimated market share: 0.9 %

The California Water Service Group, headquartered in San Jose, CA, is the holding company of six operating subsidiaries: the California Water Service Company, the Washington Water Service Company, the New Mexico Water Service Company, the Hawaii Water Service Company Inc., CWS Utility Services and HWS Utility Services. These subsidiaries provide regulated and nonregulated water services to about 500,000 people in California, Hawaii, Washington and New Mexico. The Group obtains about half of its water from wells, purchasing the rest from wholesale suppliers. A negligible proportion of its water supplies (well under 1.0%) consist of surface water. As of year-end 2013, the company had 1,125 employees.

The California Water Service Company, widely known as Cal Water, is one of the largest investor-owned water utilities in the United States. It provides services to 475,100 customers in 83 California communities. The California Public Utilities Commission (CPUC) regulates the company, which is expected to generate about $618.0 million in industry-specific revenue in 2015.

American States Water Company

Estimated market share: 0.5 %

American States Water Company (AWR) is an investor-owned utility, publicly traded on the New York Stock Exchange. IT is the parent company of Golden State Water Company (GSWC) and American States Utility Services (ASUS), as well as the latter's subsidiaries Fort Bliss Water Services Company (FBWS), Terrapin Utility Services (TUS), Old Dominion Utility Services (ODUS), Palmetto State Utility Services (PSUS) and Old North Utility Services (ONUS). Across these businesses, AWR operates in three reportable segments: water, electric and contracted services. GSWC has over 250,000 utility water customers, all in California; meanwhile, ASUS and its subsidiaries have contracts with the US government to provide water and wastewater to military facilities. American States Water Company is expected to generate about $343.3 million in industry-specific revenue in 2015.

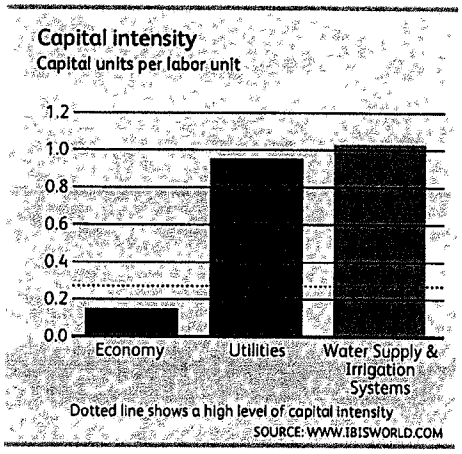
Operating Conditions

Capital Intensity | Technology & Systems | Revenue Volatility
Regulation & Policy | Industry Assistance

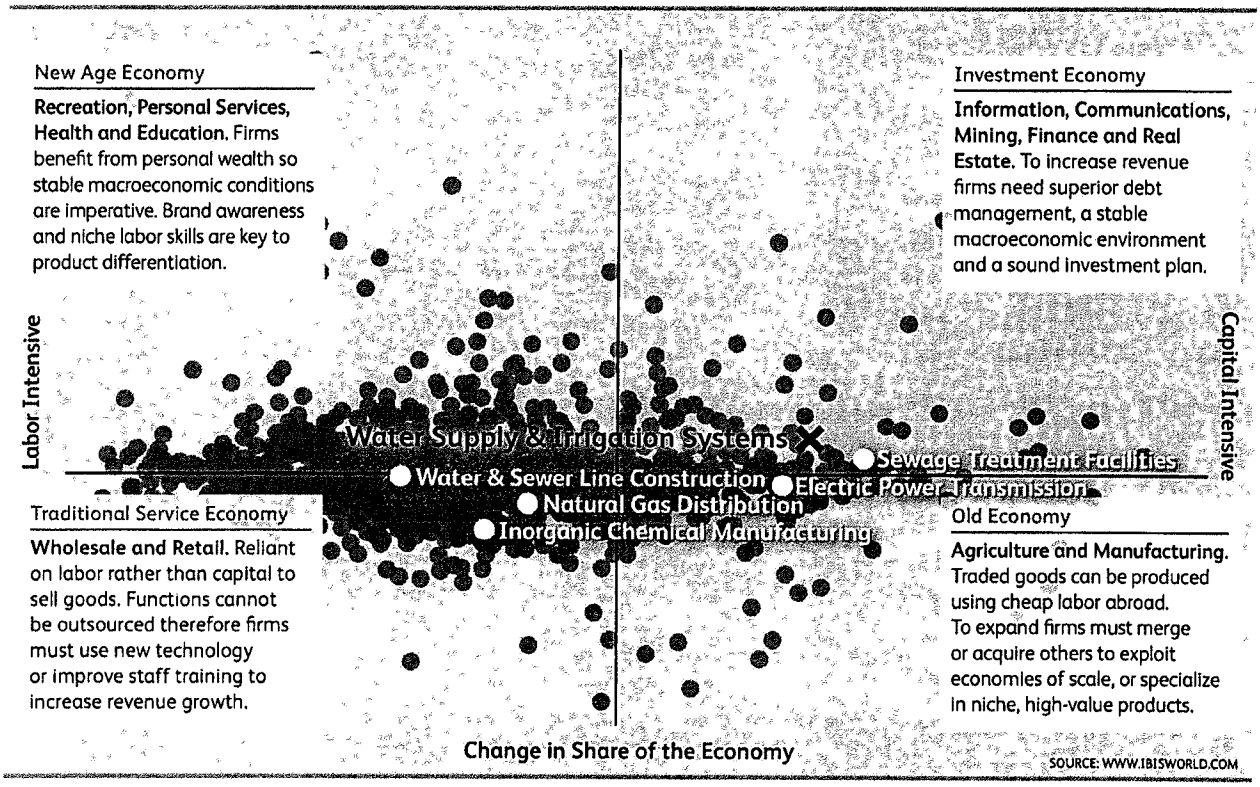
Capital Intensity

Level
The level of capital intensity is High

The Water Supply and Irrigation Systems industry is very capital intensive, with the average industry operator spending an estimated $1.03 on capital for every dollar spent on labor. The infrastructure required to supply the entire American populace with a reliable and sufficient water supply is massive, including a series of dams, pumping stations, water treatment plants and a huge distribution system of pipes. A large amount of capital must be invested to ensure that this system functions properly, as the consequences of failure can be catastrophic, with the potential of depriving populations of water or spreading serious water-borne illnesses. Industry capital intensity has expanded even more over the past five years as private firms and municipalities have increased investment in the repair and replacement of ageing water infrastructure assets.



Tools of the Trade: Growth Strategies for Success



Operating Conditions

Technology & Systems

Level
The level of Technology Change is Low

The Water Supply and Irrigation Systems industry operates by distributing water stored in dams to users via a system of pipelines. This water is almost always treated with chlorine and other chemicals to ensure that it is potable, i.e. fit for human consumption. Techniques used to treat water prior to entry into the water distribution system, as well as to monitor its purity are becoming more refined over time. For example, earlier water treatment systems typically only used sand filters, while the introduction of chlorine filtering became common in the 19th century. In modern times, the use of ozone and ultraviolet light to kill pathogens is becoming an increasingly common process in water filtration and treatment facilities. Other forms of treatment include adding coagulants to the water as it flows through tanks. The coagulants cause dirt and other contaminants to form clumps that settle to the bottom of the tanks. The water then flows through a filter for removal of the smallest contaminants, such as viruses and the parasite giardia.

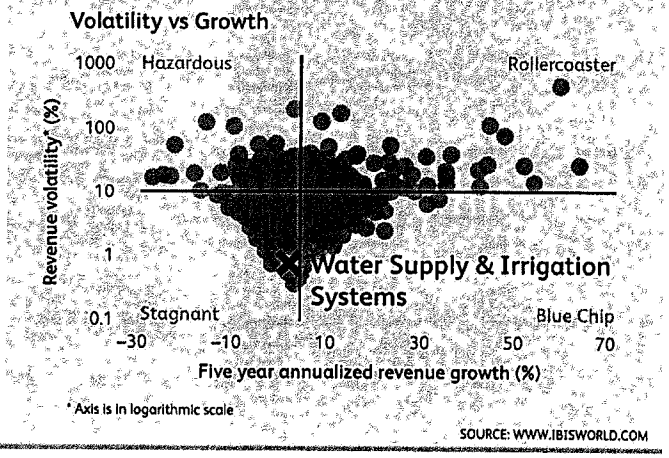
Revenue Volatility

Level
The level of Volatility is Low

The Water Supply and Irrigation Systems industry has low revenue volatility. Most water is consumed by households and any increases in water consumption are broadly linked to population growth, which amounts to about 1.0% per year. Extreme weather conditions can have a substantial influence on year-over-year industry revenue generation. For example, drought in California and much of the rest of the United States in 2013 caused an uptick in the demand for water, causing a slight boost to industry revenue that year. However, even events such as these tend to have relatively minor impacts on year-over-year industry revenue volatility. Overall, industry revenue is forecast to grow at a relatively steady rate in upcoming years, with the industry unlikely to experience major year-over-year discrepancies in revenue generation barring serious adverse weather conditions or a significant breakdown in water infrastructure.

A higher level of revenue volatility implies greater industry risk. Volatility can negatively affect long-term strategic decisions, such as the time frame for capital investment.

When a firm makes poor investment decisions it may face underutilized capacity if demand suddenly falls, or capacity constraints if it rises quickly.



Operating Conditions

Regulation & Policy

Level & Trend
The level of Regulation is Heavy and the trend is Increasing

Numerous federal drinking water regulations have been in place in the US since the passage of the Safe Drinking Water Act in 1974. The Safe Drinking Water Act establishes criteria and procedures for the Environmental Protection Agency to develop national quality standards for drinking water. Regulations issued pursuant to the Safe Drinking Water Act set standards on the amount of certain microbial and chemical contaminants and radionuclides allowable in drinking water.

The Safe Drinking Water Act was most recently amended in 1996; additional water quality standards set by the Environmental Protection Agency (EPA) have been implemented over time. Disinfection byproduct limits were lowered in 1998, and took effect in 2002. More stringent surface water treatment performance standards also became effective in 2002. In 2001, the EPA adopted a limit for arsenic in water of 10 parts per billion. The new limit, which became effective in 2006, is one-fifth of the previous allowable level and required investment spending on the part of water suppliers that did not already meet the standard.

The Clean Water Act regulates discharges from drinking water and wastewater treatment facilities into lakes, rivers, streams, and groundwater. The handling and disposal of residuals and solids from water and wastewater treatment facilities are governed by state and federal laws and regulations. Water treatment residuals and solids are a combination of the chemicals used in the treatment process and the silt and other materials removed from the raw water. Major dams are subject to federal and state regulations related to dam safety.

State regulation

In addition to federal regulation, state commissions also regulate water utilities. These commissions have broad authority to establish rates for service, prescribe service standards, and to review and approve rules and regulations. In most instances, long-term financing programs, transactions between water utilities and affiliated interests, reorganizations, mergers and acquisitions also require state commission approval to proceed. The jurisdiction exercised by each commission is prescribed by state legislation and therefore varies from state to state.

Economic regulation deals with many competing, and often conflicting, public interests and policy goals. Rate adjustment proceedings normally are initiated by the water utility. Commission staff investigates the claims and public hearings are held. These hearings, which are economic and service quality fact-finding proceedings, are typically conducted in a trial-like setting where evidence submitted. The hearings then form the basis for a commission decision. The purpose of this regulatory process is to set rates that will cover the reasonable operating costs of providing quality service to customers and allow the water utility the opportunity to earn a fair return on the investment necessary to provide that service. A rate proceeding generally focuses on four areas: the amount of investment in facilities that provide public service; the operating costs and taxes associated with providing the service; the capital costs for the funds used to provide the facilities; and the tariff design that allocates revenue requirements equitably across the customer base.

The regulatory rate setting process is time-consuming. After considering the time required to complete the regulatory process, water utilities file for rate adjustments that will reflect as closely as possible the cost of providing service during the time new rates are intended to be effective. Attempts are also made to offset any adverse financial impact

Operating Conditions

Regulation & Policy continued

arising from regulatory lag. For example, some states employ some form of forward looking test year, such as a future test year or recognition of known and measurable changes for some period beyond a historic test year. Such mechanisms result in rates that are more reflective of costs that are likely to be incurred during the period the rates will be in effect. Rate orders may also allow for the recovery of interest and depreciation expenses related to the interim period from the time a major construction project is placed into service until new rates reflecting the cost of the project become effective.

Some states allow water utilities to recover certain costs of distribution system infrastructure replacement without a full rate proceeding being filed. Distribution system infrastructure replacement is a significant element of capital expenditure, and the ability to recoup at least some of the associated cost can reduce regulatory lag and increase the time between full rate cases.

In addition, some states also permit forms of rate design known as single tariff pricing. Under this arrangement, similar rates are set for the customers of water utilities with multiple service districts, simplifying administration and reducing the complexity of rate proceedings. Single tariff pricing also spreads fixed costs over a larger customer base.

Industry Assistance

While private companies are having an increasingly important role in the operation and maintenance of the US water supply distribution system, the vast majority of water supply infrastructure in the United States is owned and operated by municipal and state government entities. These companies have access to substantial subsidies and other governmental support. The relatively high level of government assistance for the industry is due to the critical importance of a properly functioning water system to the functioning of the US economy and society, with the possibility of water supply system failure simply not viable. More specifically, government-owned water suppliers can access a range of subsidies, including federal or state interest rate subsidies or grants and transfer payments (such as movement of funds between a city's general fund and the water utility). Subsidies and transfer payments play a role in meeting the annual revenue requirement of water utilities and decrease the amount of revenue that needs to be recovered from ratepayers.

Key Statistics

Industry Data

	Revenue ($m)	Industry Value Added ($m)	Establish-ments	Enterprises	Employment	Exports	Imports	Wages ($m)	Domestic Demand	Price of Water and Sewerage Maintenance (Index)
2006	56,351.9	27,741.8	52,339	3,114	200,044	--	--	9,821.9	N/A	351.7
2007	57,448.8	25,310.0	52,110	3,100	201,315	--	--	10,143.5	N/A	360.5
2008	59,480.9	27,103.0	51,988	3,091	200,402	--	--	11,043.1	N/A	374.7
2009	61,830.1	27,151.7	51,407	3,057	200,219	--	--	10,643.1	N/A	397.6
2010	64,324.9	26,861.8	51,350	3,055	200,113	--	--	10,587.6	N/A	422.2
2011	65,164.1	30,874.6	51,295	3,051	200,228	--	--	10,934.3	N/A	437.6
2012	66,168.7	31,514.1	51,231	3,048	200,131	--	--	11,134.1	N/A	457.2
2013	67,463.6	32,669.4	51,176	3,043	201,237	--	--	11,350.9	N/A	472.9
2014	68,272.6	32,907.4	50,988	3,033	199,514	--	--	11,265.0	N/A	482.3
2015	69,159.3	33,058.2	50,972	3,028	199,422	--	--	11,342.1	N/A	489.2
2016	69,850.9	32,480.7	50,920	3,019	198,758	--	--	11,455.6	N/A	508.7
2017	70,060.5	32,438.0	50,891	3,020	198,694	--	--	11,489.9	N/A	529.1
2018	70,410.8	32,670.6	50,844	3,008	198,635	--	--	11,617.8	N/A	549.7
2019	71,044.5	32,893.6	50,828	3,007	198,586	--	--	11,793.4	N/A	571.1
2020	71,328.7	33,025.2	50,771	3,004	198,432	--	--	11,840.6	N/A	592.3
Sector Rank	4/10	3/10	1/10	2/10	2/10	N/A	N/A	2/10	N/A	N/A
Economy Rank	154/1373	94/1373	177/1373	581/1373	221/1373	N/A	N/A	171/1373	N/A	N/A

Annual Change

	Revenue (%)	Industry Value Added (%)	Establish-ments (%)	Enterprises (%)	Employment (%)	Exports (%)	Imports (%)	Wages (%)	Domestic Demand (%)	Price of Water and Sewerage Maintenance (%)
2007	1.9	-8.8	-0.4	-0.4	0.6	N/A	N/A	3.3	N/A	2.5
2008	3.5	7.1	-0.2	-0.3	-0.5	N/A	N/A	8.9	N/A	3.9
2009	3.9	0.2	-1.1	-1.1	-0.1	N/A	N/A	-3.6	N/A	6.1
2010	4.0	-1.1	-0.1	-0.1	-0.1	N/A	N/A	-0.5	N/A	6.2
2011	1.3	14.9	-0.1	-0.1	0.1	N/A	N/A	3.3	N/A	3.6
2012	1.5	2.1	-0.1	-0.1	0.0	N/A	N/A	1.8	N/A	4.5
2013	2.0	3.7	-0.1	-0.2	0.6	N/A	N/A	1.9	N/A	3.4
2014	1.2	0.7	-0.4	-0.3	-0.9	N/A	N/A	-0.8	N/A	2.0
2015	1.3	0.5	0.0	-0.2	0.0	N/A	N/A	0.7	N/A	1.4
2016	1.0	-1.7	-0.1	-0.3	-0.3	N/A	N/A	1.0	N/A	4.0
2017	0.3	-0.1	-0.1	0.0	0.0	N/A	N/A	0.3	N/A	4.0
2018	0.5	0.7	-0.1	0.4	0.0	N/A	N/A	1.1	N/A	3.9
2019	0.9	0.7	0.0	0.0	0.0	N/A	N/A	1.5	N/A	3.9
2020	0.4	0.4	-0.1	-0.1	-0.1	N/A	N/A	0.4	N/A	3.7
Sector Rank	6/10	8/10	7/10	8/10	7/10	N/A	N/A	6/10	N/A	N/A
Economy Rank	1065/1373	1188/1373	989/1373	981/1373	1023/1373	N/A	N/A	1117/1373	N/A	N/A

Key Ratios

	IVA/Revenue (%)	Imports/ Demand (%)	Exports/ Revenue (%)	Revenue per Employee ($'000)	Wages/Revenue (%)	Employees per Est.	Average Wage ($)	Share of the Economy (%)
2006	49.23	N/A	N/A	281.70	17.43	3.82	49,098.70	0.19
2007	44.06	N/A	N/A	285.37	17.66	3.86	50,386.21	0.17
2008	45.57	N/A	N/A	296.81	18.57	3.85	55,104.74	0.18
2009	43.91	N/A	N/A	308.81	17.21	3.89	53,157.29	0.19
2010	41.76	N/A	N/A	321.44	16.46	3.90	52,908.11	0.18
2011	47.38	N/A	N/A	325.45	16.78	3.90	54,609.25	0.21
2012	47.63	N/A	N/A	330.63	16.83	3.91	55,634.06	0.21
2013	48.43	N/A	N/A	335.24	16.83	3.93	56,405.63	0.21
2014	48.20	N/A	N/A	342.19	16.50	3.91	56,462.20	0.20
2015	47.80	N/A	N/A	346.80	16.40	3.91	56,874.87	0.20
2016	46.50	N/A	N/A	351.44	16.40	3.90	57,635.92	0.19
2017	46.30	N/A	N/A	352.61	16.40	3.90	57,827.11	0.18
2018	46.40	N/A	N/A	354.47	16.50	3.91	58,488.18	0.18
2019	46.30	N/A	N/A	357.75	16.60	3.91	59,386.87	0.18
2020	46.30	N/A	N/A	359.46	16.60	3.91	59,670.82	0.18
Sector Rank	3/10	N/A	N/A	10/10	3/10	10/10	9/10	3/10
Economy Rank	342/1373	N/A	N/A	547/1373	781/1373	1062/1373	527/1373	94/1373

Figures are in inflation-adjusted 2015 dollars. Rank refers to 2015 data.

SOURCE: WWW.IBISWORLD.COM

Jargon & Glossary

Industry Jargon

ENVIRONMENTAL PROTECTION AGENCY (EPA) A federal agency that regulates the industry through water-quality standards.

PUBLIC UTILITY COMMISSION (PUC) A local or state level commission that accept or reject applications for water-supply rate increases.

WASTEWATER Water that has already been used and discharged.

IBISWorld Glossary

BARRIERS TO ENTRY High barriers to entry mean that new companies struggle to enter an industry, while low barriers mean it is easy for new companies to enter an industry.

CAPITAL INTENSITY Compares the amount of money spent on capital (plant, machinery and equipment) with that spent on labor. IBISWorld uses the ratio of depreciation to wages as a proxy for capital intensity. High capital intensity is more than $0.333 of capital to $1 of labor; medium is $0.125 to $0.333 of capital to $1 of labor; low is less than $0.125 of capital for every $1 of labor.

CONSTANT PRICES The dollar figures in the Key Statistics table, including forecasts, are adjusted for inflation using the current year (i.e. year published) as the base year. This removes the impact of changes in the purchasing power of the dollar, leaving only the "real" growth or decline in industry metrics. The inflation adjustments in IBISWorld's reports are made using the US Bureau of Economic Analysis' implicit GDP price deflator.

DOMESTIC DEMAND Spending on industry goods and services within the United States, regardless of their country of origin. It is derived by adding imports to industry revenue, and then subtracting exports.

EMPLOYMENT The number of permanent, part-time, temporary and seasonal employees, working proprietors, partners, managers and executives within the industry.

ENTERPRISE A division that is separately managed and keeps management accounts. Each enterprise consists of one or more establishments that are under common ownership or control.

ESTABLISHMENT The smallest type of accounting unit within an enterprise, an establishment is a single physical location where business is conducted or where services or industrial operations are performed. Multiple establishments under common control make up an enterprise.

EXPORTS Total value of industry goods and services sold by US companies to customers abroad.

IMPORTS Total value of industry goods and services brought in from foreign countries to be sold in the United States.

INDUSTRY CONCENTRATION An indicator of the dominance of the top four players in an industry. Concentration is considered high if the top players account for more than 70% of industry revenue. Medium is 40% to 70% of industry revenue. Low is less than 40%.

INDUSTRY REVENUE The total sales of industry goods and services (exclusive of excise and sales tax); subsidies on production; all other operating income from outside the firm (such as commission income, repair and service income, and rent, leasing and hiring income); and capital work done by rental or lease. Receipts from interest royalties, dividends and the sale of fixed tangible assets are excluded.

INDUSTRY VALUE ADDED (IVA) The market value of goods and services produced by the industry minus the cost of goods and services used in production. IVA is also described as the industry's contribution to GDP, or profit plus wages and depreciation.

INTERNATIONAL TRADE The level of international trade is determined by ratios of exports to revenue and imports to domestic demand. For exports/revenue: low is less than 5%, medium is 5% to 20%, and high is more than 20%. Imports/domestic demand: low is less than 5%, medium is 5% to 35%, and high is more than 35%.

LIFE CYCLE All industries go through periods of growth, maturity and decline. IBISWorld determines an industry's life cycle by considering its growth rate (measured by IVA) compared with GDP; the growth rate of the number of establishments; the amount of change the industry's products are undergoing; the rate of technological change; and the level of customer acceptance of industry products and services.

NONEMPLOYING ESTABLISHMENT Businesses with no paid employment or payroll, also known as nonemployers. These are mostly set up by self-employed individuals.

PROFIT IBISWorld uses earnings before interest and tax (EBIT) as an indicator of a company's profitability. It is calculated as revenue minus expenses, excluding interest and tax.

VOLATILITY The level of volatility is determined by averaging the absolute change in revenue in each of the past five years. Volatility levels: very high is more than ±20%; high volatility is ±10% to ±20%; moderate volatility is ±3% to ±10%; and low volatility is less than ±3%.

WAGES The gross total wages and salaries of all employees in the industry. The cost of benefits is also included in this figure.

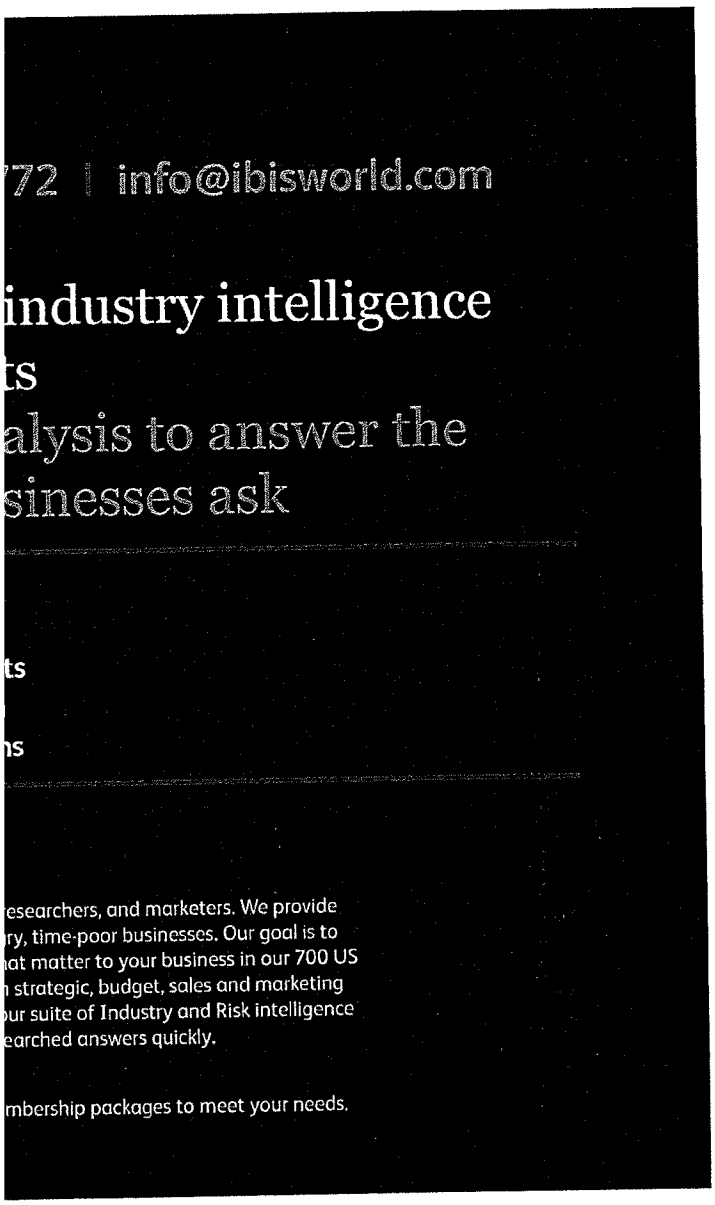
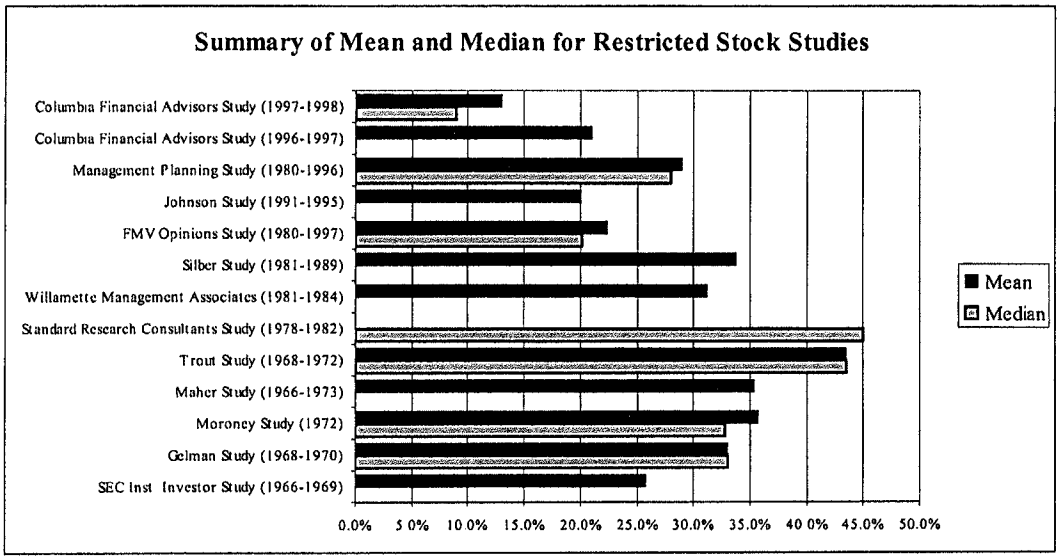


EXHIBIT QVLP-GS-9

MARKETABILITY DISCOUNT

Restricted Stock Studies

The restricted stock studies include data from 1966 through 1998. The range of discounts for lack of marketability varied from 0% to 90%, but the mean and median discounts typically fell within a range of 35% to 45%. The studies analyzed the difference in prices between publicly traded stock and restricted stocks of the same entity. The restricted stocks were identical to the traded stock in every aspect but marketability. A summary of the mean and median discounts of the restricted stock studies is presented in the following chart.



SEC Institutional Investor Study

The SEC Institutional Investor Study is the most comprehensive restricted stock study with 398 transactions from January 1, 1966, through October 22, 1969. The study analyzed differences in discounts based on the following categories: trading market, type of institution purchasing the security, transaction size, sales of the issuer and earnings of the issuer. The study found significant differences in discounts for type of exchange, sales and earnings of the issuer. Stocks listed on the major exchanges had lower discounts than smaller exchanges and over-the-counter stocks. The study found higher discounts for companies with smaller sales and lower earnings.

Gelman Study

Milton Gelman of National Economic Research Associates, Inc. conducted a study of 89 restricted stock transactions executed by four investment companies during 1968-1970. The investment companies were formed in 1968 to specialize in restricted securities. A significant portion of the funds of the investment companies were invested in restricted stock transactions consisting of shares of large and small companies listed on large and small exchanges, over-the-counter, purchased directly from the companies or from selling stockholders. Gelman's analysis found mean and median discounts of approximately 33%. In addition, 59% of the transactions had discounts of 30% or more and 36% of the transactions had discounts of 40% or more.

Moroney Study

Robert E. Moroney of Moroney, Beissner & Co. in Houston presented his restricted stock study to the Texas CPA Tax Institute in November 1972. The study was subsequently published in 1973. The analysis focused on 146 transactions in restricted securities by 10 registered investment companies. The discounts ranged from a 30% premium to a 90% discount with a mean and median discount of 35.8% and 32.8%, respectively.

Maher Study

Michael Maher, a former estate and gift tax agent with the Internal Revenue Service, published his study results in 1976. The study observed discounts for 34 restricted stock transactions from 1966 to 1973. The results of his study suggested a mean discount for his total and adjusted analyses of 35.4% and 34.7%, respectively.

Trout Study

Robert R. Trout, a principal of Trout, Shulman & Associates, analyzed 60 transactions involving the purchase of restricted stock by mutual funds from 1968 to 1972. Trout performed a regression analysis to determine the relationship between discounts and certain variables such as exchange listing, number of shares outstanding and transaction size relative to total outstanding shares. Trout's findings suggested an intercept, or implied mean and median discount of 43.5%.

Standard Research Consultants Study

A 1983 study by two Standard Research consultants, William F. Pittock and Charles H. Stryker, CPA, observed discounts relating to 28 private placements of common stock from October 1978 to June 1982. The discounts varied from 7% to 91% with a median of 45%. The results of the study tend to suggest higher discounts for companies with smaller revenues.

Willamette Management Associates Study

Willamette performed an analysis of 33 private placements of restricted stock from January 1, 1981 through May 31, 1984. There was a brief overlap in the latter part of the period included in the Standard Research Consultants Study. The Willamette study resulted in a mean discount of 31.2%.

Silber Study

William L. Silber, a professor of finance and economics at the Stern School of Business at New York University analyzed 69 private placements from 1981 through 1989. Silber's study results ranged from a 12.7% premium to an 84% discount with a mean discount of 33.8%. Silber also cited in his findings that discounts are larger when the block of restricted stock is large relative to the total shares outstanding and the dollar size is inversely related to the discount.

FMV Opinions Study

The FMV Study included over 230 transactions from 1980 through April 1997, the date of the most recent amendment of Rule 144. The mean and median discounts were 22.3% and 20.1%, respectively. The authors of the study made the following generalization regarding their analysis:

- Companies with higher revenues resulted in lower discounts and vice versa
- Companies with unrestricted stock traded on exchanges exhibited lower discounts
- Discounts were higher for blocks exceeding 10% of ownership
- Discounts for companies with capitalization under $50 million ranged from 30% to 40%

Johnson Study

Bruce A. Johnson, ASA of Munroe, Park & Johnson conducted a restricted stock study from 1991 to 1995. The study included 72 private placements with results varying from a 10% premium to a 60% discount with a mean discount of 20%. Johnson also cited four important factors to consider when evaluating potential discounts: positive net income, sales volume, transaction value and net income strength.

Management Planning Study

Management Planning, Inc. published the results of a study performed from 1980-1996 by Robert P. Oliver, ASA and Roy H. Meyers, ASA, CFA. They started with a base on 231 transactions and looked at discounts from the total sample, discounts from 53 transactions without registration rights and 27 transactions with registration rights. A summary of the mean and median discounts from their study is presented in the following table.

Table 1: Results of Management Planning Study

Discount	Entire Sample of 231 Transactions	53 Transactions without Registration Rights	27 Transactions with Registration Rights
Low	N/A	3.0%	N/A
Mean	29.0%	27.0%	12.8%
Median	28.0%	25.0%	9.1%
High	N/A	58.0%	N/A

The authors cite the difference between discounts with and without registration rights as evidence of the lack of marketability on an investment. Certain factors were also cited by the authors as the most influential in determining discounts. The factors include:

- Companies with higher revenues tend to have lower discounts
- Companies with higher earnings tend to have lower discounts
- Higher per share prices tend to have lower discounts
- Lower price volatility tends to result in lower discounts
- Block sizes representing a higher percentage of average trading volume tend to have higher discounts
- Large dollar blocks tend to have lower discounts

Columbia Financial Advisors Study

This study focused on the effect of the Rule 144 holding period reduction to one year. The study considered two periods: January 1, 1996, to April 30, 1997, and May 1, 1997, to December 31, 1998. The one-year holding period became effective April 29, 1997. A summary of the study results is presented in the following table.

Table 2: Summary of Columbia Financial Advisors Study

	January 1, 1996 to April 30, 1997	May 1, 1997 to December 31, 1998
Number of Transactions	23	15
Low	0.8%	0.0%
Mean	21.0%	13.0%
Median	N/A	9.0%
High	67.5%	30.0%

Summary of Restricted Stock Studies

The 12 restricted stock studies previously mentioned were performed from 1966 to 1998 and generally suggest a discount range from 23% to 45%, with a median of 33%. The studies also cited several company and security specific factors in determining the estimated discount.

PRE-IPO STUDIES

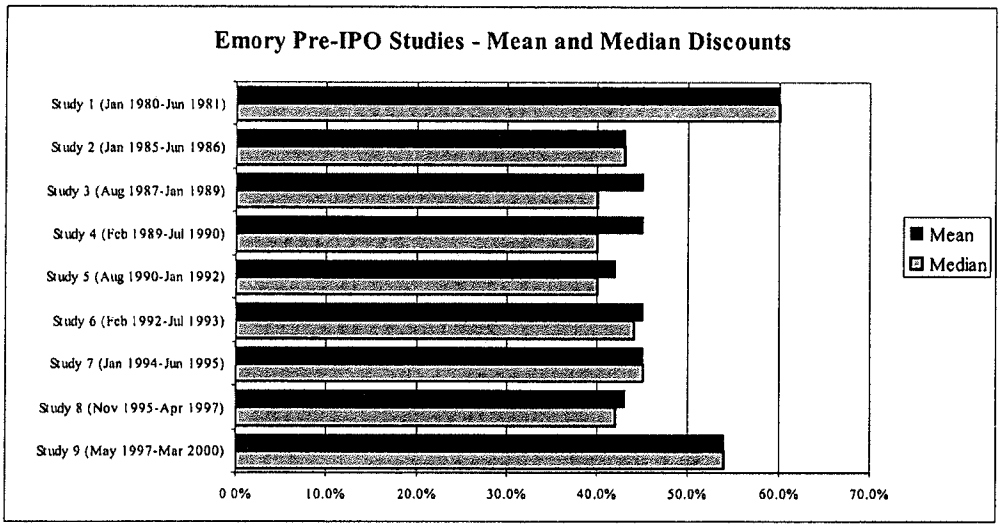
In recent years, a number of pre-IPO studies were performed to support marketability discounts. The methodology applied in these studies is based on the initial offering price (the price prior to public trading). This price is reduced by the price per share at the time of the last private transaction (which must be less than five months prior to the initial offering to qualify for the study) and adjusted by an appropriate index to account for related market or sector movements over the five-month period. The resulting amount is divided by the initial offering price to arrive at the appropriate discount. The pre-IPO methodology of determining marketability discounts is a relevant method as private stockholders experience an inability to freely sell their stock in the open market, similar to restricted stockholders. Furthermore, private stockholders differ from unrestricted public stockholders, much like restricted stockholders, because there is not a public forum in which investments can be easily liquidated (which is only one of the differences between private and public stockholders).

Emory Studies

John Emory, Sr., ASA began his pre-IPO studies with Baird & Co. and continued his studies with his own firm, Emory Business Valuation, LLC. Emory has completed nine studies with the original published in June 1986. The first eight studies eliminated development-stage companies, companies with historical operating losses and companies with IPO prices less than $5 per share. The ninth study deviated from the previous studies as follows:

- Included only companies with "com" in their names
- Review period was increased from 18 months in the previous studies to 35 months
- All transactions were actual sales as opposed to the previous studies that included options
- Most of the companies did not have earnings

The study consisted of 53 transactions. The mean and median discounts by study are presented in the following chart.



Willamette Management Associates Pre-IPO Study

This study observed 556 companies and 1,007 transactions from 1975 through 1997. The adjusted mean discount[1] for each time period varied from 28.9% to 56.8%. The mean for the entire review period was 44.2%. The median discount range was from 31.8% to 73.1% with the overall median at 50.4%. The Willamette study found the standard mean discount was greater than 35% for all but three of the 14 periods in the study and that median discounts exceeded 40% in all but one year.

Valuation Advisors Pre-IPO Study

Two studies were conducted by Valuation Advisors for the calendar years of 1999 and 2000. The mean discount of these studies was 48.9%. The key feature of this study was the inclusion of holding period based upon the length of time between the private transaction and the IPO. The study confirmed the author's initial hypothesis that higher discounts accompany longer holding periods.

[1] Excluded highest and lowest deciles of indicated discounts