

Web Appendix for Testing for Factor Price Equality with Unobserved Differences in Factor Quality or Productivity

Andrew B. Bernard*

Tuck School of Business at Dartmouth, NBER & CEPR

Stephen J. Redding†

Princeton University, NBER & CEPR

Peter K. Schott‡

Yale School of Management & NBER

August 20, 2012

Abstract

This web appendix contains additional empirical results discussed but not reported in the main paper.

*100 Tuck Hall, Hanover, NH 03755, USA, tel: (603) 646-0302, fax: (603) 646-0995, email: andrew.b.bernard@tuck.dartmouth.edu

†Fisher Hall, Princeton, NJ 08540. tel: (609) 258-4016, fax: (609) 258-6419, email: reddings@princeton.edu

‡135 Prospect Street, New Haven, CT 06520, USA, tel: (203) 436-4260, fax: (203) 432-6974, email: peter.schott@yale.edu

EA	Name	1972		1992		2007	
		Coef	SE	Coef	SE	Coef	SE
1	Bangor, ME	-0.215	0.010	0.053	0.008	0.027	0.009
2	Portland, ME	0.053	0.007	0.131	0.005	0.159	0.007
3	Boston, MA	0.263	0.005	0.243	0.004	0.285	0.005
4	Burlington, VT	-0.047	0.009	0.005	0.006	0.153	0.007
5	Albany, NY	0.151	0.006	0.074	0.006	0.114	0.005
6	Syracuse, NY	0.011	0.005	0.058	0.005	0.168	0.004
7	Rochester, NY	0.127	0.005	0.087	0.005	0.055	0.005
8	Buffalo, NY	0.071	0.005	0.029	0.004	0.109	0.005
9	State College, PA	-0.162	0.007	-0.096	0.006	-0.056	0.006
10	New York, NY	0.243	0.005	0.211	0.004	0.220	0.005
11	Harrisburg, PA	-0.046	0.005	-0.018	0.005	0.063	0.004
12	Philadelphia, PA	0.126	0.004	0.135	0.004	0.185	0.005
13	Washington, DC	0.088	0.005	0.040	0.004	0.044	0.004
14	Salisbury, MD	-0.076	0.010	-0.029	0.009	0.050	0.008
15	Richmond, VA	0.020	0.007	0.008	0.006	-0.016	0.006
16	Staunton, VA	0.005	0.009	-0.212	0.009	-0.059	0.008
17	Roanoke, VA	0.022	0.006	0.006	0.006	0.028	0.006
18	Greensboro, NC	0.117	0.006	0.029	0.005	-0.012	0.005
19	Raleigh, NC	0.054	0.007	0.068	0.005	0.061	0.005
20	Norfolk, VA	0.027	0.006	0.161	0.005	0.150	0.006
21	Greenville, NC	0.000	0.009	-0.050	0.006	-0.030	0.007
22	Fayetteville, NC	-0.001	0.010	-0.379	0.009	-0.050	0.008
23	Charlotte, NC	0.178	0.005	0.103	0.004	0.025	0.005
24	Columbia, SC	0.073	0.008	0.031	0.006	-0.031	0.006
25	Wilmington, NC	-0.104	0.007	-0.091	0.007	-0.017	0.007
26	Charleston, SC	0.065	0.009	0.189	0.008	0.187	0.007
27	Augusta, GA	0.101	0.008	-0.029	0.008	-0.145	0.007
28	Savannah, GA	0.064	0.007	0.087	0.009	-0.052	0.007
29	Jacksonville, FL	-0.047	0.006	0.007	0.004	0.142	0.006
30	Orlando, FL	0.149	0.006	0.163	0.004	0.201	0.004
31	Miami, FL	0.156	0.005	0.182	0.005	0.157	0.006
32	Fort Myers, FL	0.063	0.013	-0.001	0.009	0.153	0.007
33	Sarasota, FL	0.089	0.009	0.137	0.007	0.162	0.006
34	Tampa, FL	0.121	0.005	0.230	0.004	0.149	0.004
35	Tallahassee, FL	-0.040	0.009	0.104	0.008	0.047	0.008
36	Dothan, AL	-0.153	0.010	-0.018	0.008	-0.032	0.009
37	Albany, GA	0.008	0.007	-0.107	0.008	-0.101	0.008
38	Macon, GA	-0.064	0.006	-0.155	0.006	-0.148	0.006
39	Columbus, GA	-0.117	0.008	-0.120	0.008	-0.022	0.009
40	Atlanta, GA	0.066	0.005	-0.003	0.004	0.034	0.004
41	Greenville, SC	0.057	0.007	0.039	0.006	-0.029	0.005
42	Asheville, NC	0.039	0.009	0.094	0.006	0.109	0.006
43	Chattanooga, TN	0.032	0.005	-0.043	0.006	-0.102	0.006
44	Knoxville, TN	0.062	0.007	-0.074	0.005	0.099	0.005
45	Johnson City, TN	-0.057	0.006	-0.090	0.007	-0.157	0.008
46	Hickory, NC	-0.023	0.008	-0.066	0.007	0.020	0.007
47	Lexington, KY	-0.084	0.007	-0.089	0.005	-0.148	0.006
48	Charleston, WV	-0.072	0.006	0.020	0.006	-0.083	0.005
49	Cincinnati, OH	0.179	0.006	0.233	0.004	0.120	0.004
50	Dayton, OH	0.124	0.005	0.070	0.005	0.068	0.005
51	Columbus, OH	-0.001	0.005	0.037	0.004	0.037	0.004
52	Wheeling, WV	-0.280	0.011	-0.139	0.010	-0.132	0.010
53	Pittsburgh, PA	0.013	0.005	0.049	0.004	0.144	0.004
54	Erie, PA	0.076	0.007	0.045	0.006	-0.015	0.005
55	Cleveland, OH	0.166	0.005	0.082	0.004	0.070	0.004
56	Toledo, OH	0.006	0.005	-0.064	0.005	-0.005	0.004
57	Detroit, MI	0.165	0.005	0.148	0.004	0.183	0.004

Notes: Table lists estimated relative wage bill and associated standard error by BEA Economic Area and year (see text). Economic areas have been abbreviated to indicate first city and state they encompass.

Table A-1: Estimated Relative Wage Bill Coefficients and Standard Errors (1 of 3)

EA Name	1972		1992		2007	
	Coef	SE	Coef	SE	Coef	SE
58 Northern Michigan, MI	0.003	0.011	-0.018	0.008	-0.067	0.009
59 Green Bay, WI	-0.095	0.007	0.046	0.007	0.120	0.006
60 Appleton, WI	0.018	0.008	0.108	0.006	-0.040	0.006
61 Traverse City, MI	0.022	0.009	0.046	0.007	0.152	0.007
62 Grand Rapids, MI	0.156	0.005	0.145	0.004	0.181	0.004
63 Milwaukee, WI	0.153	0.004	0.166	0.004	0.229	0.004
64 Chicago, IL	0.242	0.004	0.193	0.004	0.127	0.005
65 Elkhart, IN	0.063	0.006	0.001	0.004	0.049	0.004
66 Fort Wayne, IN	0.032	0.006	-0.049	0.005	-0.095	0.005
67 Indianapolis, IN	0.046	0.004	-0.015	0.004	0.007	0.004
68 Champaign, IL	0.049	0.006	-0.028	0.006	-0.146	0.006
69 Evansville, IN	-0.115	0.006	-0.128	0.006	-0.093	0.005
70 Louisville, KY	0.049	0.006	-0.058	0.006	-0.024	0.005
71 Nashville, TN	0.034	0.005	-0.094	0.004	-0.048	0.005
72 Paducah, KY	-0.187	0.012	-0.141	0.009	-0.093	0.011
73 Memphis, TN	0.046	0.005	-0.080	0.004	-0.061	0.005
74 Huntsville, AL	-0.117	0.008	-0.134	0.007	-0.124	0.006
75 Tupelo, MS	-0.211	0.007	-0.062	0.006	-0.139	0.006
76 Greenville, MS	-0.186	0.011	-0.215	0.011	-0.144	0.014
77 Jackson, MS	-0.031	0.005	-0.129	0.005	-0.097	0.006
78 Birmingham, AL	0.031	0.005	-0.021	0.004	0.015	0.005
79 Montgomery, AL	-0.115	0.007	-0.092	0.007	0.043	0.007
80 Mobile, AL	0.113	0.008	0.093	0.007	-0.097	0.008
81 Pensacola, FL	-0.050	0.010	0.073	0.008	0.031	0.008
82 Biloxi, MS	-0.144	0.009	0.116	0.009	-0.038	0.012
83 New Orleans, LA	0.108	0.006	0.153	0.007	0.040	0.006
84 Baton Rouge, LA	0.024	0.009	-0.013	0.009	-0.043	0.007
85 Lafayette, LA	0.051	0.011	-0.186	0.010	-0.082	0.008
86 Lake Charles, LA	-0.034	0.009	-0.109	0.009	-0.290	0.009
87 Beaumont, TX	0.004	0.008	-0.224	0.008	-0.103	0.008
88 Shreveport, LA	-0.083	0.007	-0.020	0.006	-0.087	0.006
89 Monroe, LA	-0.073	0.009	-0.112	0.009	0.005	0.008
90 Little Rock, AR	-0.139	0.005	-0.137	0.005	-0.010	0.005
91 Fort Smith, AR	-0.146	0.008	-0.012	0.009	-0.123	0.009
92 Fayetteville, AR	-0.195	0.009	-0.162	0.007	-0.005	0.006
93 Joplin, MO	-0.047	0.007	-0.161	0.008	-0.064	0.007
94 Springfield, MO	-0.175	0.007	-0.095	0.006	0.010	0.007
95 Jonesboro, AR	-0.205	0.008	-0.319	0.009	-0.175	0.008
96 St. Louis, MO	0.101	0.004	0.051	0.005	0.012	0.004
97 Springfield, IL	-0.045	0.008	-0.147	0.007	-0.069	0.008
98 Columbia, MO	-0.123	0.008	-0.109	0.008	-0.062	0.007
99 Kansas City, MO	0.083	0.005	0.099	0.004	0.077	0.005
100 Des Moines, IA	0.107	0.005	-0.056	0.004	0.030	0.004
101 Peoria, IL	-0.092	0.006	-0.049	0.007	-0.039	0.007
102 Davenport, IA	0.064	0.007	0.038	0.006	-0.013	0.005
103 Cedar Rapids, IA	0.022	0.008	0.025	0.008	0.079	0.007
104 Madison, WI	-0.015	0.006	-0.037	0.006	-0.009	0.004
105 La Crosse, WI	-0.061	0.011	-0.059	0.008	-0.152	0.007
106 Rochester, MN	0.034	0.008	0.033	0.007	0.007	0.007
107 Minneapolis, MN	0.142	0.004	0.130	0.004	0.215	0.005
108 Wausau, WI	-0.105	0.008	-0.123	0.007	-0.204	0.007
109 Duluth, MN	-0.079	0.010	-0.093	0.009	0.072	0.008
110 Grand Forks, ND	0.048	0.012	-0.215	0.014	-0.370	0.010
111 Minot, ND	-0.112	0.012	0.265	0.015	-0.298	0.015
112 Bismarck, ND	-0.245	0.014	0.044	0.012	-0.155	0.010
113 Fargo, ND	-0.149	0.009	0.059	0.010	0.073	0.008
114 Aberdeen, SD	-0.009	0.017	-0.301	0.017	-0.312	0.013

Notes: Table lists estimated relative wage bill and associated standard error by BEA Economic Area and year (see text). Economic areas have been abbreviated to indicate first city and state they encompass.

Table A-2: Estimated Relative Wage Bill Coefficients and Standard Errors (2 of 3)

EA Name	1972		1992		2007	
	Coef	SE	Coef	SE	Coef	SE
115 Rapid City, SD	0.070	0.013	0.050	0.011	0.033	0.011
116 Sioux Falls, SD	0.175	0.008	0.022	0.007	-0.111	0.006
117 Sioux City, IA	-0.002	0.009	-0.111	0.009	-0.114	0.008
118 Omaha, NE	-0.003	0.006	-0.088	0.006	-0.041	0.005
119 Lincoln, NE	0.046	0.009	-0.127	0.007	-0.040	0.006
120 Grand Island, NE	-0.084	0.010	-0.168	0.009	-0.156	0.007
121 North Platte, NE	-0.076	0.021	-0.065	0.019	-0.059	0.018
122 Wichita, KS	0.025	0.005	-0.020	0.005	-0.026	0.005
123 Topeka, KS	-0.109	0.009	-0.041	0.007	-0.134	0.008
124 Tulsa, OK	0.081	0.005	-0.011	0.005	0.021	0.005
125 Oklahoma City, OK	0.056	0.007	-0.056	0.005	-0.050	0.005
126 Western Oklahoma, OK	-0.191	0.013	-0.197	0.016	-0.214	0.017
127 Dallas, TX	0.093	0.004	0.103	0.004	0.096	0.004
128 Abilene, TX	-0.046	0.011	-0.010	0.010	-0.205	0.011
129 San Angelo, TX	-0.244	0.013	0.351	0.011	0.172	0.015
130 Austin, TX	0.143	0.008	0.139	0.006	0.157	0.006
131 Houston, TX	0.105	0.004	0.097	0.004	0.047	0.004
132 Corpus Christi, TX	0.050	0.009	-0.035	0.010	-0.057	0.009
133 McAllen, TX	-0.146	0.010	-0.004	0.010	-0.049	0.007
134 San Antonio, TX	0.013	0.007	0.092	0.006	0.079	0.006
135 Odessa, TX	-0.004	0.011	0.038	0.010	-0.083	0.009
136 Hobbs, NM	0.115	0.012	-0.016	0.014	-0.160	0.013
137 Lubbock, TX	0.010	0.008	0.086	0.009	0.004	0.008
138 Amarillo, TX	0.013	0.010	-0.096	0.009	-0.044	0.009
139 Santa Fe, NM	0.058	0.016	0.174	0.013	-0.003	0.017
140 Pueblo, CO	-0.314	0.010	0.082	0.011	0.006	0.008
141 Denver, CO	0.230	0.005	0.174	0.004	0.156	0.004
142 Scottsbluff, NE	-0.225	0.017	-0.201	0.015	-0.198	0.014
143 Casper, WY	-0.109	0.013	-0.147	0.012	-0.005	0.009
144 Billings, MT	-0.016	0.009	0.047	0.010	-0.054	0.008
145 Great Falls, MT	-0.165	0.015	0.083	0.017	-0.094	0.013
146 Missoula, MT	-0.118	0.011	-0.034	0.010	-0.100	0.009
147 Spokane, WA	-0.027	0.007	-0.016	0.006	0.120	0.006
148 Idaho Falls, ID	0.004	0.010	-0.080	0.010	-0.031	0.009
149 Twin Falls, ID	-0.081	0.013	-0.163	0.012	-0.118	0.009
150 Boise City, ID	-0.065	0.009	-0.036	0.007	0.003	0.007
151 Reno, NV	-0.099	0.009	0.033	0.007	0.051	0.006
152 Salt Lake City, UT	0.036	0.005	-0.009	0.005	0.057	0.005
153 Las Vegas, NV	-0.084	0.012	0.044	0.007	-0.086	0.006
154 Flagstaff, AZ	-0.049	0.014	-0.126	0.010	0.153	0.009
155 Farmington, NM	0.055	0.017	-0.002	0.012	0.170	0.013
156 Albuquerque, NM	0.115	0.008	0.024	0.008	0.076	0.007
157 El Paso, TX	-0.010	0.011	-0.054	0.008	-0.039	0.010
158 Phoenix, AZ	0.128	0.007	0.072	0.004	0.151	0.005
159 Tucson, AZ	0.008	0.011	0.198	0.008	0.081	0.007
160 Los Angeles, CA	0.236	0.005	0.222	0.004	0.175	0.005
161 San Diego, CA	0.164	0.007	0.269	0.006	0.268	0.005
162 Fresno, CA	0.020	0.007	-0.014	0.005	0.057	0.005
163 San Francisco, CA	0.128	0.004	0.221	0.004	0.160	0.004
164 Sacramento, CA	-0.025	0.007	0.086	0.005	0.058	0.005
165 Redding, CA	0.049	0.012	-0.192	0.010	-0.152	0.009
166 Eugene, OR	0.027	0.008	0.048	0.005	0.094	0.007
167 Portland, OR	0.083	0.005	0.060	0.004	0.129	0.004
168 Pendleton, OR	-0.181	0.013	-0.174	0.012	-0.206	0.013
169 Richland, WA	-0.187	0.009	-0.084	0.008	-0.192	0.007
170 Seattle, WA	0.021	0.005	0.171	0.004	0.111	0.004

Notes: Table lists estimated relative wage bill and associated standard error by BEA Economic Area and year (see text). Economic areas have been abbreviated to indicate first city and state they encompass.

Table A-3: Estimated Relative Wage Bill Coefficients and Standard Errors (3 of 3)

	Number of Common Industries		
	1972	1992	2007
$ \alpha_r - \alpha_s $	-64.35 1.98	-44.28 1.87	-63.10 2.04
Industries _r	0.37 0.004	0.42 0.003	0.42 0.003
Industries _s	0.28 0.003	0.33 0.003	0.36 0.003
Constant	-18.15 0.50	-32.49 0.56	-35.90 0.60
Observations	14,365	14,365	14,365
R-squared	0.80	0.83	0.85

Notes: OLS regression of the number of industries a region pair produces in common on the difference in regions' estimated relative wage bill and the number of industries produced in each region. Sample size equals the number of unique region pairs. Robust standard errors noted below each coefficient.

Table A-4: Industry Overlap and Relative Wage Bills Across Region Pairs, by Year

	Change in the Number of Common Industries	
	1972-1992	1972-2007
$\Delta \alpha_r - \alpha_s $	-4.83 0.65	-6.71 0.62
$\Delta\text{Industries}_r$	0.43 0.006	0.33 0.006
$\Delta\text{Industries}_s$	0.32 0.006	0.19 0.005
Constant	-1.04 0.12	5.73 0.09
Observations	14,365	14,365
R-squared	0.52	0.42

Notes: OLS regression of the change in the number of industries a region pair produces in common between noted years on the change in the difference between regions' estimated relative wage bills and the change in the number of industries produced in each region. Sample size equals the number of unique region pairs. Robust standard errors noted below each coefficient.

Table A-5: Changes in Industry Overlap and Changes in Relative Wage Bills Across Region Pairs, by Year