

Do labor and management see eye to eye?

Examination of reliability and validity of human resource practices

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Abstract

Studies of human resource (HR) practices and firm/establishment performance have relied on data obtained from single key informant, which has raised criticism of the reliability and validity of HR practices. This paper examines the reliability and validity of HR practices with data obtained from the paired key informants, a manager and an employee representative. Specifically, it explores how they systematically differ in evaluating HR practices and how the systematic difference affects the relationship between HR practices and establishment performance. To do this it analyzes the 2011 Workplace Labor-Management Relations Survey administered by the Korea Labor Foundation. The survey provides rich information on proliferation of the best HR practices and labor-management collaboration at the establishment level. In particular, one of its merits lies on the fact that the same questionnaires are asked to a management and an employee representative (a union representative for unionized establishments).

As for reliability of each HR practice, the results from generalizability theory show that a generalizability coefficient, an analogue of the coefficient of internal consistency, is 0.73 for grievance filing, 0.74 for the discretion level of self-managed team, and 0.73 for information sharing, while being 0.31 for job security. The reliability analysis indicates that management and employee representative tend to systematically differently but

consistently evaluate the adoption of and the level of utilization of HR practices, except those of job security policy.

As for validity of HR practices, establishment performance is regressed on a composite measure of HR practices that is computed for each of the paired key informants and other establishment and control variables. A composite measure of HR practices is measured with a sum of the standardized value of the following practices: the level of wage and benefit per employee, performance evaluation, information sharing, quality circle, team empowerment, individual incentive, profit/gain sharing, job rotation, grievance filing, and job security.

Establishment performance is measured two-fold: 1) objective measures including sales per employee, operating profits per employee, and turnover rate, and 2) subjective measures with Likert-type scales including turnover rate, productivity, and innovative activity of employees.

The regression results show that the effect size of HR practices measured with the management's responses is stronger for both objective and subjective measures than that measured with the employee representative's responses. All the coefficients of each composite measure of HR practices are statistically significant at the 0.05 level. These results indicate that data from management (employee representative) as single key informant produce an upper (lower) bound of the effect size. Given the statistical significance of the lower-bound estimates, a statistical inference based on the upper-bound estimates does not lead to a misleading conclusion.

Literature review

- Single Response Organizational Surveys (SROS)
 - Despite of their advantages, SROS have several disadvantages
 - Gupta, Shaw & Delery(2000) showed a systematic difference in the return rate of survey.
 - Liao, Toya, Lepak, & Hong(2009) showed that employees' perception on the adoption of HR practices were different by their characteristics (e.g., position, status, and job).
- HRM researchers has a tendency to depend on internal consistency estimates of reliability (e.g., Cronbach's coefficient alpha, Spearman-Brown, etc.) using the information from SROS (Schmidt and Hunter, 1996)
- SROS may suffer from errors from a rater (Huselid and Becker, 1996)
 - Using internal consistency estimates is ignoring multiple sources of error(Deshon, 1998).

Literature review

- Disputes between Huelid & Becker(2000) and Gerhart et al.(2000)
 - Internal consistency methods overestimate reliability
 - Gerhart et al.(2000) suggest to use generalizability theory (Cronbach, et al., 1972) to estimate reliability
 - Generalizability theory has an advantage to consider multiple sources of error simultaneously(Gerhart et al., 2000)
 - A multiple rater design works better than a single rater survey in reducing measurement error
 - Intra-class correlation is often adopted to reduce concern on interrater reliability.
 - Huselid & Becker(2000) suggest that biases from firm size, sample size, respondents, items, and rater affect the responses from SROS, but are not substantial.
 - Having a knowledgeable key informant can reduce disadvantages of SROS and outweigh costs associated with conducting a research with a multiple rater design

Literature Review

- "Implicit theory" and SROS?
 - "... in the absence of complete and accurate information regarding HR practices, respondents to HR surveys may respond in a way consistent with their firms' performance, such that those for high(low) performance firms will exhibit a bias for over(under)reporting the prevalence of these practices (Gardner & Wright, 2009, p.22)."
 - It is likely that successful companies have high performance HR practices
 - Can be construed as a bias from self-reports

Research Questions

- Concerning efficiency...
 - Should HRM researchers find five employees per establishment out of a total of 250 establishments in order to compute an interrater reliability?
 - How about finding another key informant per establishment who are supposed to have a drastically different point of view on HRM?
 - A union representative or an employee representative for a nonunion establishment as another key informant
 - He or she is supposed to be akin to the adoption and utilization of HR practices and firm performance for his/her purposes, thereby being highly knowledgeable about them.
 - His/her job is supposed to voice his/her members' best interests.
 - A cooperative or conflictual relationship with the firm may affect his/her survey responses, but a bias from this relationship is a systematic error, not a random, so it can be accounted for.
 - Consider job security
 - It is likely that a response from a HR manager would be upper-bound and a response from a union representative lower-bound.

Research Questions

- Are the survey responses from union representatives more reliable compared to the those from managers?
- Do HR managers, as a single key informant, who hold implicit theories provide biased survey responses?
- If so, does the bias has a material effect on the effect size of the HR-firm performance relationship?

Data

Workplace Labor-Management Relations Survey(WLM)

- administered by the Korea Labor Foundation(KLF), the nonprofit organization funded by the Korean Ministry of Employment and Labor.
- The key missions of the survey is to identify 1) the extent to which management and union collaborate at the establishment level, 2) proliferation of the best HRM practices
- The survey includes items asking workplace industrial relations, HRM, work organization, and governance structure.
- ✓ One of the key advantages of the WLM lies in a deliberate survey design that asks the exactly same survey items on HRM practices and IR variables to a management representative and an employee representative (or a union representative for union establishment)

Data

Sample

Sample size from 1130 to 497

Industry – manufacture

- ✓ Possibility of difference between manufacture and service industry
- ✓ Exclude service industry to keep homogenous trait of sample

Excluding missing variables

➤ Important findings are similar to results of our study

Method

- Reliability analysis
 - Cronbach's alpha & Generalizability coefficient
- Comparison of HRM estimates from the regressions below:
 - $\text{Performance}_i = f(\text{Control}, \text{HRM}_M, e_{iM})$
 - $\text{Performance}_i = f(\text{Control}, \text{HRM}_L, e_{iL})$
 - $\text{Performance}_i = f(\text{Control}, \text{HRM}_{(M+L)/2}, e_{i(M+L)/2})$

Variables

Innovative activity	Innovative activity is measured as 5-point Liker scale. A respondent is asked to assess a degree of employees' innovative activity relative industry average. Response option ranged from 1, "very low", to 5, "very high"
Productivity	Productivity is measured as 5-point Likert scale. A respondent is asked to assess level of firm's productivity relative to average level of its industry. Response option ranged from 1, "very low," to 5, "very high".
Turnover rate	Turnover rate is separated into 2 variables. Quantitative measure of turnover rate is calculated as a proportion of the number of voluntarily departed employees to that of total employees. Qualitative measure of turnover rate is measured as 5-point Likert scale assessing perceived degrees of turnover rate relative to that of average level of industry a firm belonged to(1=very low, 5=very high).
Sales	Sales is defined as sales per full-time employee. This is measured as a proportion of total sales to the number of full time employees.
Operational profit	Operational profit is defined as sales minus total cost per full-time employee. This is measured as a proportion of total operational profit to the number of full time employees.
Compensation	Compensation is measured as sum of total wage per employee and total benefit per employee.
Individual Incentive	Individual incentive is measured as dichotomous variable that take 1 if a firm employs individual incentive program, 0 otherwise.
Profit/Gain sharing	Profit/Gain sharing is measured as dichotomous variable that take 1 if a firm employs profit sharing or gain sharing program, 0 otherwise.
Job rotation	Job rotation is measured as dichotomous variable that take 1 if a firm employs job rotation practice, 0 otherwise.
Evaluation	These variables are measured as 5-point Likert scale. Response option ranged from 1, "strongly disagree," to 5, "strongly agree". An example of 'team empowerment' item is "Team assign their job on their own decision". Evaluation is measured as average of 6 items. Job security, Information sharing, and Grievance filing is measured as average of 4 items. Team empowerment is measured as average of 5 items. These variables are asked to both manager and union representative.
Job Security	
Information sharing	
Team empowerment	
Grievance filing	
Quality circle	Quality circle is measured as dichotomous variable that take 1 if a firm employs quality circle, 0 otherwise. This variable is asked to both manager and union representative
HR bundle	HR bundle is calculated as a sum of standardized value of HR practices including compensation, individual incentive, profit/gain sharing, job rotation, evaluation, job security, information sharing, team empowerment, grievance filing, and quality circle.
Age	Age is calculated as 2010 minus the founding year
Size	Size is measured as logarithm of total employees.
Market competition	Market competition is measured as 5-point Liker scale. Respondent was asked to assess the degree to which industry they primarily belonged to is competitive (1=there is no competition, 5=extremely competitive)
Unionization	WLM doesn't provide a union coverage which is defined as the percentage of a firm's employee belong to a union. Thus, unionization is coded 1 if there is any union, and if there is not.
Industry	We used only manufacture industry sample. Industry is coded 1 if its primal products are belong to metal, automobile, and other transportation machinery production, 2 if it primal product are electricity or precise machinery, 3 its primal product is chemical product, and 0 otherwise.
Firm type	Type of a firm is coded 1 if it is listed in stock market, 2 if it is listed on KOSDAQ(Korea Securities Dealers Automated Quotation) which is similar to NASDAQ(National Association of Securities Dealers Automated Quotations), and 0 if it is not listed.

Table 1

Reliability Estimates for job security, discretion of self-managed team, information sharing, and grievance filing					
Reliability estimate given different source(s) of measurement error:					
Job Security(4-item)					
Sampling of items(internal consistency reliability)	management		labor-union	total	
Cronbach's alpha	0.752		0.7758		0.726
Sampling of items and raters					
Generalizability coefficient(1 rater, 1 items)					0.1156
Generalizability coefficient(1 rater, 4 items)					0.1838
Generalizability coefficient(2 rater, 4 items)					0.3066
Generalizability coefficient(4 rater, 4 items)					0.4603
Discretion of self-managed team (5-item)					
Sampling of items(internal consistency reliability)	management		labor-union	total	
Cronbach's alpha	0.8328		0.8433		0.8971
Sampling of items and raters					
Generalizability coefficient(1 rater, 1 items)					0.4129
Generalizability coefficient(1 rater, 5 items)					0.6338
Generalizability coefficient(2 rater, 5 items)					0.7428
Generalizability coefficient(4 rater, 5 items)					0.8127
Information Sharing(4-item)					
Sampling of items(internal consistency reliability)	management		labor-union	total	
Cronbach's alpha	0.8976		0.8861		0.8939
Sampling of items and raters					
Generalizability coefficient(1 rater, 1 items)					0.4685
Generalizability coefficient(1 rater, 4 items)					0.5985
Generalizability coefficient(2 rater, 4 items)					0.7316
Generalizability coefficient(4 rater, 4 items)					0.8231
Grievance Filing (4-item)					
Sampling of items(internal consistency reliability)	management		labor-union	total	
Cronbach's alpha	0.8809		0.8864		0.8921
Sampling of items and raters					
Generalizability coefficient(1 rater, 1 items)					0.4685
Generalizability coefficient(1 rater, 4 items)					0.5985
Generalizability coefficient(2 rater, 4 items)					0.7316
Generalizability coefficient(4 rater, 4 items)					0.8231

Table 2-1, Means, standard deviations, min, max, and correlations

	Mean	S.D.	Min	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1 Innovative activity	3.06	0.77	1	5	1																		
2 Productivity	3.15	0.74	1	5	0.408	1																	
3 Turnover rate Ql	2.78	0.89	1	5	-0.062	0.031	1																
4 Turnover rate Qt	5.78	7.62	0	50	-0.083	-0.071	0.146	1															
5 Sales	524.41	1047.94	0	16129.03	0.009	0.035	-0.097	-0.072	1														
6 Operational profit	27.86	77.65	-439.14	833.33	0.012	0.028	-0.108	-0.109	0.539	1													
7 Age	26.49	16.5	0	106	-0.07	-0.133	-0.13	-0.12	-0.006	-0.008	1												
8 Size_In	5.58	0.79	4.61	8.88	0.01	-0.074	-0.08	-0.167	0.049	0.042	0.245	1											
9 Market competition	3.61	0.81	1	5	0.115	0.105	0.051	0.001	-0.001	0.104	0.008	0.128	1										
10 Unionization	0.57	0.5	0	1	-0.14	-0.145	-0.103	-0.158	0.04	0.042	0.361	0.223	-0.09	1									
11 Industry 1	0.56	0.5	0	1	-0.014	-0.109	-0.097	0.065	-0.082	-0.112	-0.042	0.078	-0.076	0.046	1								
12 Industry 2	0.14	0.34	0	1	-0.013	0.035	0.06	-0.05	0.062	0.005	-0.075	-0.012	0.049	-0.067	-0.452	1							
13 Industry 3	0.13	0.33	0	1	0.063	0.126	0.06	-0.002	0.032	0.148	-0.001	-0.073	0.06	0.002	-0.433	-0.151	1						
14 Firm Type 1	0.17	0.37	0	1	-0.019	-0.014	-0.054	-0.089	0.119	0.111	0.245	0.194	0.076	0.186	-0.391	-0.041	0.1	1					
15 Firm Type 2	0.4	0.49	0	1	-0.039	-0.119	-0.139	0.077	-0.088	-0.075	0.003	0.087	-0.055	-0.116	0.598	-0.21	-0.261	-0.367	1				
16 Compensation_In	8.1	0.36	7.14	9.11	0.043	-0.032	-0.168	-0.127	0.249	0.113	0.228	0.396	-0.013	0.207	0.057	-0.077	-0.031	0.126	-0.003	1			
17 Individual Incentive	0.46	0.5	0	1	0.081	-0.018	-0.012	-0.06	0.053	0.054	-0.003	0.11	0.01	-0.045	0.055	0.001	-0.001	0.017	0.115	0.1	1		
18 Profit/Gain sharing	0.29	0.46	0	1	0.045	-0.009	0.038	-0.024	0.004	0.078	0.131	0.072	0.078	0.088	0.026	-0.019	-0.012	0.04	0.034	0.088	0.341	1	
19 Job rotation	0.38	0.49	0	1	0.101	-0.044	-0.144	-0.096	0.056	0.042	0.126	0.208	0.005	0.112	0.101	-0.031	-0.069	-0.042	0.109	0.221	0.096	0.033	1
20 Evaluation_mgr	3.34	0.68	1	5	0.322	0.233	-0.039	-0.138	0.092	0.068	-0.035	0.097	0.066	-0.021	-0.051	0.006	0.056	0.063	-0.1	0.117	0.046	0.013	0.182
21 Job security_mgr	3.43	0.57	1	5	0.277	0.153	-0.145	-0.131	0.025	0.076	0.028	0.07	0.126	-0.007	0.04	-0.063	-0.02	0.047	0.063	0.123	0.016	0	0.218
22 Information sharing_mgr	3.42	0.66	1	5	0.337	0.261	-0.043	-0.069	0.083	0.092	-0.032	0.132	0.074	-0.036	-0.095	-0.019	0.049	0.081	-0.061	0.163	0.036	0.028	0.173
23 Quality Circle_mgr	0.43	0.5	0	1	-0.015	0.044	0.085	-0.087	0.063	0.033	0.017	0.056	0.027	0.231	-0.267	0.265	0.182	0.073	-0.51	0.102	-0.026	0.118	-0.005
24 Team empowerment_mgr	3.19	0.52	1	5	0.187	0.193	0.028	-0.049	0.014	0.034	-0.063	-0.078	0.09	-0.081	-0.146	0.036	0.118	0.106	-0.197	-0.024	-0.036	0.022	0.043
25 Grievance filing_mgr	3.58	0.58	1.5	5	0.283	0.214	-0.056	-0.124	0.095	0.13	0.01	0.121	0.099	0.086	-0.051	-0.027	0.072	0.096	-0.031	0.104	0.052	0.039	0.166
26 Evaluation_union	3.18	0.73	1	5	0.246	0.221	0.037	-0.061	0.065	.09	-0.114	-0.021	0.082	-0.153	-0.134	0.042	0.122	0.035	-0.183	0.026	0.014	-0.055	0.05
27 Job security_union	3.4	0.64	1	5	0.276	0.13	-0.058	-0.027	0.022	0.025	-0.007	-0.043	0.068	-0.064	-0.1	0.059	0.101	0.045	-0.061	-0.055	-0.022	-0.035	0.054
28 Information sharing_union	3.28	0.68	1	5	0.277	0.266	0.029	-0.033	0.122	0.127	-0.112	-0.004	0.089	-0.156	-0.15	0.054	0.1	0.069	-0.149	0.069	0.045	-0.008	0.041
29 Quality circle_union	0.43	0.5	0	1	-0.019	0.049	0.1	-0.085	0.066	0.034	0.011	0.042	0.019	0.231	-0.267	0.274	0.182	0.073	-0.51	0.091	-0.032	0.104	-0.012
30 Team empowerment_union	3.18	0.53	1	4.8	0.173	0.181	0.024	-0.048	0.014	0.029	-0.06	-0.118	0.086	-0.129	-0.154	0.051	0.13	0.072	-0.168	-0.076	-0.049	-0.017	-0.021
31 Grievance filing_union	3.45	0.64	1	5	0.255	0.235	-0.018	-0.107	0.067	0.064	-0.058	0.022	0.068	-0.007	-0.14	0.042	0.146	0.078	-0.171	0.028	-0.02	-0.059	0.082
32 Evaluation	3.26	0.6	1	4.83	0.329	0.264	0	-0.114	0.092	0.093	-0.088	0.042	0.086	-0.104	-0.11	0.029	0.105	0.056	-0.167	0.082	0.034	-0.026	0.132
33 Job security	3.41	0.47	1	4.75	0.361	0.185	-0.13	-0.099	0.03	0.064	0.012	0.014	0.124	-0.049	-0.044	0.002	0.057	0.06	-0.003	0.038	-0.005	-0.024	0.171
34 Information sharing	3.35	0.58	1	5	0.352	0.303	-0.007	-0.058	0.119	0.127	-0.083	0.073	0.094	-0.111	-0.141	0.02	0.086	0.086	-0.121	0.133	0.046	0.011	0.122
35 Quality circle	0.43	0.49	0	1	-0.017	0.047	0.093	-0.086	0.065	0.034	0.014	0.049	0.023	0.233	-0.269	0.272	0.183	0.074	-0.513	0.097	-0.029	0.112	-0.008
36 Team empowerment	3.19	0.48	1	4.6	0.195	0.202	0.028	-0.052	0.015	0.035	-0.067	-0.106	0.095	-0.114	-0.163	0.047	0.134	0.096	-0.197	-0.055	-0.046	0.002	0.012
37 Grievance filing	3.51	0.54	1.88	5	0.305	0.257	-0.041	-0.131	0.091	0.109	-0.03	0.078	0.094	0.042	-0.112	0.011	0.127	0.098	-0.119	0.072	0.016	-0.015	0.138
38 HR bundle_mgr	0.64	4.57	-17.11	14.26	0.334	0.194	-0.092	-0.187	0.15	0.149	0.086	0.25	0.113	0.116	-0.065	0.018	0.069	0.12	-0.113	0.405	0.357	0.369	0.447
39 HR bundle_union	0.5	4.54	-13.94	13.43	0.311	0.201	-0.034	-0.143	0.151	0.142	0.03	0.145	0.102	0.022	-0.146	0.086	0.14	0.105	-0.202	0.306	0.328	0.312	0.336
40 HR bundle	0.6	4.39	-16.12	14.7	0.353	0.223	-0.064	-0.172	0.153	0.146	0.046	0.188	0.115	0.051	-0.125	0.062	0.122	0.118	-0.182	0.351	0.333	0.326	0.394

Table 2-2, (continued) Means, standard deviations, min, max, and correlations

		20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
20	Evaluation_mgr	1																				
21	Job security_mgr	0.49	1																			
22	Information sharing_mgr	0.632	0.525	1																		
23	Quality Circle_mgr	0.038	-0.135	-0.005	1																	
24	Team empowerment_mgr	0.323	0.221	0.325	0.126	1																
25	Grievance filing_mgr	0.53	0.44	0.623	-0.003	0.27	1															
26	Evaluation_union	0.474	0.257	0.408	0.114	0.415	0.373	1														
27	Job security_union	0.263	0.169	0.264	0.056	0.166	0.27	0.485	1													
28	Information sharing_union	0.371	0.251	0.52	0.089	0.351	0.394	0.674	0.446	1												
29	Quality circle_union	0.034	-0.145	-0.01	0.974	0.113	-0.009	0.105	0.069	0.096	1											
30	Team empowerment_union	0.218	0.161	0.237	0.096	0.711	0.204	0.421	0.299	0.343	0.113	1										
31	Grievance filing_union	0.342	0.212	0.347	0.144	0.292	0.54	0.594	0.494	0.605	0.145	0.324	1									
32	Evaluation	0.847	0.43	0.601	0.09	0.432	0.522	0.869	0.44	0.615	0.082	0.377	0.55	1								
33	Job security	0.483	0.733	0.506	-0.045	0.25	0.457	0.493	0.794	0.463	-0.041	0.306	0.472	0.569	1							
34	Information sharing	0.574	0.444	0.87	0.049	0.388	0.582	0.622	0.408	0.874	0.05	0.333	0.547	0.697	0.555	1						
35	Quality circle	0.036	-0.141	-0.008	0.993	0.12	-0.006	0.11	0.063	0.093	0.993	0.105	0.145	0.087	-0.043	0.05	1					
36	Team empowerment	0.292	0.206	0.304	0.12	0.923	0.256	0.452	0.252	0.375	0.122	0.926	0.333	0.437	0.301	0.389	0.122	1				
37	Grievance filing	0.491	0.364	0.543	0.085	0.321	0.862	0.558	0.442	0.576	0.083	0.305	0.892	0.612	0.53	0.642	0.084	0.338	1			
38	HR bundle_mgr	0.674	0.58	0.702	0.262	0.436	0.647	0.408	0.224	0.418	0.24	0.278	0.377	0.624	0.512	0.641	0.252	0.385	0.575	1		
39	HR bundle_union	0.431	0.262	0.454	0.358	0.416	0.448	0.691	0.575	0.688	0.361	0.468	0.666	0.658	0.558	0.656	0.362	0.478	0.642	0.75	1	
40	HR bundle	0.59	0.45	0.607	0.329	0.47	0.55	0.634	0.483	0.632	0.32	0.427	0.62	0.714	0.61	0.711	0.327	0.484	0.669	0.901	0.957	1

Table 3

Innovative activity	Model 1-1	Model 1-2	Model 1-3	Model 1-4	Model 1-5	Model 1-6
age	0.001 (0.002)	0 (0.002)	0.001 (0.002)	0 (0.002)	0 (0.002)	0 (0.002)
size	-0.028 (0.047)	0.004 (0.048)	-0.011 (0.047)	-0.052 (0.046)	-0.021 (0.046)	-0.043 (0.045)
market competition	0.02 (0.040)	0.018 (0.040)	0.004 (0.039)	0.03 (0.040)	0.029 (0.040)	0.024 (0.040)
unionization	-0.194** (0.073)	-0.111 (0.075)	-0.143* (0.072)	-0.215** (0.071)	-0.154* (0.072)	-0.175* (0.071)
industry2	0.126 (0.115)	0.133 (0.116)	0.135 (0.113)	0.061 (0.114)	0.059 (0.115)	0.051 (0.113)
industry3	0.05 (0.124)	0.013 (0.127)	0.028 (0.123)	-0.032 (0.121)	-0.084 (0.123)	-0.076 (0.120)
industry4	0.131 (0.125)	0.124 (0.127)	0.115 (0.123)	0.102 (0.123)	0.073 (0.125)	0.068 (0.123)
firm type1	-0.113 (0.105)	-0.126 (0.107)	-0.13 (0.103)	-0.114 (0.105)	-0.117 (0.106)	-0.119 (0.104)
firm type2	-0.179+ (0.097)	-0.194* (0.099)	-0.185+ (0.096)	-0.102 (0.088)	-0.076 (0.090)	-0.064 (0.088)
compensation	-0.037 (0.095)	0.066 (0.098)	0 (0.095)			
individual incentive	0.092 (0.068)	0.074 (0.070)	0.086 (0.067)			
Profit/Gain sharing	0.049 (0.075)	0.12 (0.077)	0.1 (0.074)			
job rotation	0.036 (0.069)	0.126+ (0.069)	0.047 (0.068)			
evaluation	0.160* (0.064)	-0.005 (0.065)	0.076 (0.080)			
Job security	0.128+ (0.067)	0.192** (0.061)	0.317*** (0.087)			
Information sharing	0.131+ (0.072)	0.142* (0.070)	0.177* (0.084)			
quality circle	-0.013 (0.080)	-0.111 (0.081)	-0.059 (0.079)			
team empowerment	0.032 (0.074)	0.093 (0.076)	0.02 (0.084)			
grievance filing	0.215** (0.075)	0.150* (0.071)	0.203* (0.086)			
HR Bundle				0.064*** (0.007)	0.059*** (0.007)	0.067*** (0.007)
R_2	0.208	0.174	0.232	0.165	0.143	0.176
Adjusted_R2	0.177	0.141	0.201	0.148	0.126	0.159
F-value	6.6	5.28	7.57	9.6	8.12	10.41

n=497

Table 4

Productivity	Model 2-1	Model 2-2	Model 2-3	Model 2-4	Model 2-5	Model 2-6
age	-0.002 (0.002)	-0.003 (0.002)	-0.002 (0.002)	-0.003 (0.002)	-0.003 (0.002)	-0.003 (0.002)
size	-0.054 (0.047)	-0.04 (0.047)	-0.052 (0.047)	-0.07 (0.045)	-0.046 (0.045)	-0.061 (0.045)
market competition	0.004 (0.039)	0.008 (0.039)	0.001 (0.039)	0.014 (0.039)	0.015 (0.040)	0.012 (0.039)
unionization	-0.170* (0.072)	-0.117 (0.073)	-0.133+ (0.072)	-0.173* (0.070)	-0.134+ (0.070)	-0.147* (0.070)
industry2	-0.107 (0.113)	-0.088 (0.114)	-0.083 (0.113)	-0.143 (0.112)	-0.14 (0.113)	-0.147 (0.112)
industry3	0.085 (0.123)	0.094 (0.124)	0.097 (0.123)	0.044 (0.118)	0.018 (0.120)	0.02 (0.119)
industry4	0.207+ (0.123)	0.231+ (0.124)	0.215+ (0.123)	0.206+ (0.121)	0.195 (0.123)	0.189 (0.121)
firm type1	-0.103 (0.103)	-0.095 (0.105)	-0.104 (0.103)	-0.105 (0.103)	-0.104 (0.104)	-0.106 (0.103)
firm type2	-0.001 (0.096)	-0.014 (0.096)	-0.007 (0.096)	-0.009 (0.086)	0 (0.088)	0.011 (0.087)
compensation	0.059 (0.094)	0.082 (0.096)	0.063 (0.094)			
individual incentive	-0.052 (0.067)	-0.075 (0.068)	-0.065 (0.067)			
Profit/Gain sharing	0.062 (0.074)	0.101 (0.075)	0.091 (0.074)			
job rotation	-0.036 (0.068)	0.029 (0.068)	-0.015 (0.068)			
evaluation	0.054 (0.064)	-0.032 (0.064)	-0.003 (0.080)			
Job security	0.049 (0.066)	-0.052 (0.060)	-0.014 (0.087)			
Information sharing	0.091 (0.071)	0.191** (0.069)	0.214* (0.084)			
quality circle	0.009 (0.079)	-0.051 (0.080)	-0.033 (0.079)			
team empowerment	0.169* (0.073)	0.143+ (0.074)	0.152+ (0.084)			
grievance filing	0.182* (0.074)	0.135+ (0.069)	0.193* (0.086)			
HR Bundle				0.041*** (0.007)	0.034*** (0.007)	0.040*** (0.007)
R_2	0.157	0.134	0.16	0.122	0.102	0.119
Adjusted_R2	0.123	0.1	0.126	0.104	0.083	0.101
F-value	4.66	3.89	4.77	6.75	5.51	6.56

n=497

Table 5

Turnover S	Model 3-1	Model 3-2	Model 3-3	Model 3-4	Model 3-5	Model 3-6
age	-0.004 (0.003)	-0.003 (0.003)	-0.004 (0.003)	-0.004 (0.003)	-0.004 (0.003)	-0.004 (0.003)
size	0.081 (0.060)	0.077 (0.060)	0.075 (0.060)	0.041 (0.058)	0.026 (0.057)	0.035 (0.057)
market competition	0.028 (0.050)	0.02 (0.050)	0.032 (0.050)	0.026 (0.050)	0.025 (0.050)	0.027 (0.050)
unionization	-0.103 (0.093)	-0.138 (0.093)	-0.116 (0.093)	-0.131 (0.090)	-0.155+ (0.090)	-0.147+ (0.089)
industry2	-0.156 (0.146)	-0.162 (0.145)	-0.161 (0.145)	-0.114 (0.143)	-0.117 (0.143)	-0.112 (0.143)
industry3	-0.145 (0.158)	-0.137 (0.158)	-0.135 (0.158)	-0.07 (0.152)	-0.056 (0.153)	-0.056 (0.152)
industry4	-0.065 (0.158)	-0.057 (0.158)	-0.058 (0.157)	0.005 (0.155)	0.01 (0.156)	0.015 (0.156)
firm type1	-0.240+ (0.133)	-0.230+ (0.133)	-0.228+ (0.132)	-0.220+ (0.132)	-0.221+ (0.132)	-0.219+ (0.132)
firm type2	-0.165 (0.124)	-0.153 (0.123)	-0.147 (0.123)	-0.242* (0.111)	-0.246* (0.112)	-0.254* (0.112)
compensation	-0.252* (0.121)	-0.306* (0.122)	-0.283* (0.121)			
individual incentive	-0.044 (0.087)	-0.043 (0.087)	-0.048 (0.087)			
Profit/Gain sharing	0.109 (0.095)	0.089 (0.096)	0.09 (0.095)			
job rotation	-0.157+ (0.088)	-0.178* (0.086)	-0.154+ (0.087)			
evaluation	0.013 (0.082)	0.043 (0.081)	0.067 (0.103)			
Job security	-0.158+ (0.085)	-0.148+ (0.076)	-0.288* (0.112)			
Information sharing	0.01 (0.091)	0.012 (0.087)	0.023 (0.108)			
quality circle	0.006 (0.102)	0.083 (0.101)	0.037 (0.102)			
team empowerment	0.125 (0.094)	0.107 (0.094)	0.155 (0.108)			
grievance filing	-0.124 (0.096)	-0.092 (0.088)	-0.131 (0.111)			
HR Bundle				-0.026** (0.009)	-0.020* (0.009)	-0.025** (0.009)
R_2	0.086	0.084	0.094	0.056	0.05	0.055
Adjusted_R2	0.049	0.048	0.058	0.037	0.031	0.036
F-value	2.35	2.31	2.61	2.9	2.57	2.83

n=497

Table 6

Turnover O	Model 4-1	Model 4-2	Model 4-3	Model 4-4	Model 4-5	Model 4-6
age	-0.007 (0.024)	-0.006 (0.024)	-0.005 (0.024)	-0.002 (0.024)	-0.002 (0.024)	-0.003 (0.024)
size	-0.692 (0.513)	-0.701 (0.521)	-0.701 (0.518)	-0.656 (0.493)	-0.824+ (0.490)	-0.725 (0.491)
market competition	0.107 (0.430)	0.019 (0.435)	0.091 (0.432)	0.092 (0.428)	0.083 (0.431)	0.106 (0.429)
unionization	-1.995* (0.788)	-2.407** (0.805)	-2.288** (0.798)	-2.143** (0.765)	-2.409** (0.766)	-2.323** (0.763)
industry2	0.812 (1.240)	0.366 (1.254)	0.659 (1.247)	0.223 (1.220)	0.19 (1.227)	0.238 (1.223)
industry3	0.053 (1.347)	-0.239 (1.372)	0.063 (1.361)	-0.621 (1.294)	-0.46 (1.307)	-0.466 (1.299)
industry4	0.745 (1.349)	0.383 (1.366)	0.715 (1.357)	0.128 (1.324)	0.19 (1.335)	0.234 (1.329)
firm type1	0.268 (1.131)	0.219 (1.153)	0.28 (1.140)	0.202 (1.123)	0.195 (1.129)	0.207 (1.124)
firm type2	1 (1.052)	1.159 (1.063)	0.99 (1.059)	1.428 (0.946)	1.382 (0.957)	1.306 (0.953)
Compensation	-0.668 (1.033)	-1.025 (1.057)	-1.014 (1.046)			
individual incentive	-1.324+ (0.740)	-1.322+ (0.755)	-1.362+ (0.746)			
Profit/Gain sharing	0.919 (0.812)	0.666 (0.831)	0.693 (0.820)			
job rotation	0.22 (0.750)	-0.35 (0.748)	0.037 (0.750)			
evaluation	-2.059** (0.698)	-0.753 (0.705)	-2.018* (0.887)			
Job security	-1.492* (0.724)	-0.019 (0.661)	-1.236 (0.961)			
Information sharing	2.046** (0.779)	0.676 (0.755)	1.966* (0.933)			
quality circle	-1.191 (0.865)	-0.623 (0.879)	-0.856 (0.877)			
team empowerment	-0.102 (0.800)	-0.737 (0.816)	-0.353 (0.928)			
grievance filing	-1.289 (0.815)	-0.836 (0.763)	-1.099 (0.953)			
HR Bundle				-0.280*** (0.077)	-0.226** (0.079)	-0.267*** (0.077)
R_2	0.117	0.084	0.104	0.084	0.075	0.082
Adjusted_R2	0.082	0.047	0.068	0.065	0.056	0.063
F-value	3.33	2.3	2.92	4.47	3.95	4.35

n=497

Table 7

Sales	Model 5-1	Model 5-2	Model 5-3	Model 5-4	Model 5-5	Model 5-6
age	-4.345 (3.286)	-4.192 (3.311)	-3.757 (3.312)	-2.983 (3.285)	-2.955 (3.286)	-2.914 (3.286)
size	-89.876 (70.588)	-78.778 (70.504)	-93.369 (70.793)	15.23 (68.714)	27.652 (67.929)	21.155 (68.294)
market competition	-16.443 (59.156)	-22.505 (58.849)	-18.503 (59.093)	-40.859 (59.668)	-42.432 (59.731)	-42.908 (59.728)
unionization	-1.058 (108.566)	32.019 (108.966)	15.794 (109.073)	13.322 (106.586)	42.552 (106.213)	32.381 (106.214)
industry2	80.305 (170.804)	79.108 (169.614)	92.328 (170.516)	58.109 (170.074)	54.873 (170.214)	54.964 (170.165)
industry3	299.656 (185.449)	297.542 (185.667)	317.947+ (186.102)	235.822 (180.307)	207.564 (181.244)	217.093 (180.825)
industry4	162.01 (185.714)	161.288 (184.848)	172.838 (185.527)	113.955 (184.529)	96.666 (185.166)	100.308 (184.967)
firm type1	281.759+ (155.691)	278.060+ (156.009)	286.567+ (155.875)	312.282* (156.470)	309.567* (156.549)	311.018* (156.494)
firm type2	-85.405 (144.886)	-63.785 (143.766)	-70.751 (144.841)	-27.768 (131.848)	-11.765 (132.701)	-12.245 (132.607)
compensation	770.755*** (142.243)	748.091*** (142.977)	740.874*** (142.987)			
individual incentive	68.957 (101.854)	63.953 (102.077)	65.713 (101.959)			
Profit/Gain sharing	-59.032 (111.841)	-57.179 (112.432)	-57.691 (112.119)			
job rotation	42.923 (103.264)	50.387 (101.150)	38.317 (102.596)			
evaluation	68.847 (96.077)	-29.556 (95.320)	37.497 (121.247)			
Job security	-94.193 (99.764)	-9.554 (89.406)	-113.67 (131.405)			
Information sharing	-0.486 (107.224)	156.66 (102.174)	122.529 (127.624)			
quality circle	-37.544 (119.154)	-38.44 (118.902)	-39.732 (119.962)			
team empowerment	-103.792 (110.233)	-45.462 (110.452)	-118.904 (126.920)			
grievance filing	138.662 (112.247)	1.222 (103.251)	96.956 (130.313)			
HR Bundle				30.192** (10.790)	30.046** (10.907)	30.017** (10.758)
R_2	0.095	0.094	0.095	0.039	0.039	0.039
Adjusted_R2	0.059	0.058	0.059	0.019	0.019	0.019
F-value	2.64	2.61	2.63	1.98	1.95	1.97

n=497

Table 8

Operational Profit	Model 6-1	Model 6-2	Model 6-3	Model 6-4	Model 6-5	Model 6-6
age	-0.368 (0.244)	-0.354 (0.245)	-0.343 (0.246)	-0.309 (0.238)	-0.309 (0.238)	-0.306 (0.238)
size	-2.429 (5.234)	-2.206 (5.223)	-2.887 (5.252)	-0.762 (4.980)	0.292 (4.929)	-0.178 (4.955)
market competition	7.649+ (4.386)	8.192+ (4.360)	8.147+ (4.384)	7.913+ (4.325)	7.888+ (4.334)	7.836+ (4.333)
unionization	5.892 (8.049)	10.63 (8.072)	8.667 (8.092)	7.075 (7.725)	9.09 (7.708)	8.435 (7.706)
industry2	-5.598 (12.664)	-6.31 (12.565)	-4.985 (12.650)	-8.939 (12.326)	-8.935 (12.352)	-8.988 (12.345)
industry3	5.607 (13.750)	5.023 (13.754)	6.101 (13.807)	-0.604 (13.068)	-2.208 (13.152)	-1.682 (13.118)
industry4	34.373* (13.769)	33.462* (13.693)	34.154* (13.764)	29.336* (13.374)	28.486* (13.437)	28.632* (13.419)
firm type1	15.472 (11.543)	15.911 (11.557)	15.769 (11.564)	17.348 (11.340)	17.274 (11.360)	17.339 (11.353)
firm type2	0.102 (10.742)	3.422 (10.650)	1.693 (10.745)	8.404 (9.556)	9.148 (9.630)	9.211 (9.620)
compensation	21.929* (10.546)	20.051+ (10.592)	20.351+ (10.608)			
individual incentive	2.512 (7.552)	1.561 (7.562)	2.128 (7.564)			
Profit/Gain sharing	11.784 (8.292)	11.301 (8.329)	11.664 (8.318)			
job rotation	3.644 (7.656)	4.861 (7.493)	3.501 (7.611)			
evaluation	-3.512 (7.123)	3.636 (7.061)	0.225 (8.995)			
Job security	3.223 (7.397)	-3.313 (6.623)	-2.7 (9.749)			
Information sharing	0.183 (7.950)	12.742+ (7.569)	11.14 (9.468)			
quality circle	-5.927 (8.834)	-6.872 (8.808)	-6.982 (8.900)			
team empowerment	-4.475 (8.173)	-2.939 (8.182)	-6.458 (9.416)			
grievance filing	14.108+ (8.322)	-3.993 (7.649)	5.56 (9.668)			
HR Bundle				2.103** (0.782)	1.901* (0.791)	1.948* (0.780)
R_2	0.073	0.073	0.072	0.059	0.056	0.057
Adjusted_R2	0.036	0.036	0.035	0.04	0.037	0.038
F-value	1.97	1.99	1.93	3.05	2.9	2.95

n=497

Results

			innovative_act	productivity	turnover	sales	Operational profit
Qualitative dependent variables	Manager	B	0.064	0.041	-0.026		
		s.e.	0.007	0.007	0.009		
	Labor union	β	0.059	0.034	-0.02		
		s.e.	0.007	0.007	0.009		
	Average	β	0.067	0.04	-0.025		
		s.e.	0.007	0.007	0.009		
	Manager	β			-0.280	30.192	2.103
		s.e.			0.077	10.79	0.782
Quantatative dependent variables	Labor union	β			-0.226	30.046	1.901
		s.e.			0.079	10.907	0.791
	Average	β			-0.267	30.017	1.948
		s.e.			0.077	10.758	0.78

Discussion

- Internal consistency reliability
 - No big difference in internal consistency reliabilities estimated with the responses from a manager and an employee representative separately
 - Job security, Discretion of self-managed team, Information Sharing, Grievance
- Generalizability coefficient
 - With the same measurement condition as the dataset, Generalizability coefficients of Discretion of self-managed team, Information Sharing, Grievance were relatively high, ranging from 0.73 to 0.74.
 - An exception was found in job security
 - With the same measurement condition as the dataset, its Generalizability coefficient was only 0.31, indicating that only 31% of total variance in job security was explained.
- Overall, the reliability analysis suggests
 - A high internal consistency reliability does not necessarily mean the low level of measurement error.
 - Management and labor generally share common point of view on the HRM, but a researcher would be better off if he/she prepares for additional item(s) to probe in case of important but highly sensitive object of measurement.

Discussion

- Evidence of bias from “self-reports” or “implicit theory”
 - Always higher coefficients of HRM bundle measured from a manager were found in performance measures, proximal/distal or qualitative/quantitative, compared to those measured from an employee representative
 - However, the differences in the magnitude of coefficients were small in that statistical inference does remain the same.
- The use of the mean of the responses from both sides does not necessarily produce best-fit results.
- Overall, it seems reasonable to regard the coefficients estimated using a manager’s responses as an upper-bound estimate and these using an employee’s responses as a lower-bound.
 - The true effects are likely to be somewhere between the two estimated effects.

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