Supplemental Data

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Supplementary Table S1: The summary of descriptive statistics of suicide mortalities desegregated by gender- age- and motive-factors between 2009 and 2017 (dependent variables).

	Male+Female			Male			Female		
	mean	±	SD	mean	±	SD	mean	±	SD
(Age)									
SDR per population (100,000)	21.25	±	4.20	30.74	±	6.51	12.32	±	2.61
10s	2.40	±	1.03	3.22	±	1.67	1.54	±	1.11
20s	20.45	±	4.92	29.36	±	7.68	11.17	±	4.52
30s	21.87	±	5.20	30.28	±	7.60	10.96	±	4.04
40s	25.81	±	6.54	36.22	±	10.25	12.20	±	4.25
50s	29.71	±	7.41	41.88	±	11.74	14.17	±	4.34
60s	26.23	±	6.85	34.92	±	10.09	14.34	±	4.48
70s	26.68	±	6.24	35.71	±	9.80	17.57	±	5.85
80s	28.33	±	8.20	44.20	±	13.53	18.20	±	7.50
(Motive)									
Family	3.22	±	1.00	4.33	±	1.50	2.20	±	0.81
Health	10.69	±	3.06	13.05	±	4.06	8.49	±	2.49
Economy	4.19	±	1.87	7.79	±	3.56	0.82	±	0.45
Employment	1.86	±	0.61	3.34	±	1.17	0.38	±	0.25
Romance	0.73	±	0.29	0.93	±	0.45	0.50	±	0.31
School	0.28	±	0.18	0.43	±	0.30	0.14	±	0.16

Supplementary Table S2: The summary of descriptive statistics of household and social/employment factors and their VIF (Variance Inflation Factor) between 2009 and 2017 (independent variables and covariates).

	mean	±	SD	VIF
(Household factor)				
dual-income household rate (%)	26.71	±	3.98	2.62
minority rate per household	0.29	±	0.03	1.62
elderly rate per household	0.06	±	0.02	2.07
savings per household (million YEN)	11.98	±	3.09	2.55
liabilities per household (million YEN)	6.71	±	1.78	1.45
yearly incomes per household (million YEN)	6.96	±	0.69	3.26
(Social/employment factor)				
employment rate (%)	43.01	±	2.83	2.49
male temporary employment rate (%)	2.56	±	0.72	3.01
female temporary employment rate (%)	7.24	±	1.44	2.84
certification of long-term Care Insurance ratio per population (100,000)	185.25	±	19.72	1.85
completely unemployment rate (%)	3.68	±	1.06	2.20

Supplementary Table S3: Impacts of dual-income household rate, other household and social/employment factors on suicide mortalities of Male+Female caused by motives associated with family-, health-, economy-, employment-, romance- and school-related problems between 2009 and 2017.

Factors	family β	SE	P value	health β	SE	P value	economy β	SE	P value	employment β	SE	P value	romance β	SE	P value	school β	SE	P value
Model_1																		
dual-income rate	0.056	0.022	0.013 *	0.103	0.087	0.243	0.039	0.033	0.243	0.034	0.013	0.015 *	-0.006	0.005	0.193	0.007	0.003	0.068
X² value	130.70		<0.001 **	240.78		<0.001 **	132.45		<0.001 **	118.22		<0.001 **	40.33		<0.001 **	48.03		<0.001 **
Model_2																		
dual-income rate	0.093	0.025	0.000 **	0.270	0.095	0.007 **	0.140	0.036	0.000 **	0.049	0.017	0.006 **	0.005	0.006	0.427	0.009	0.004	0.023 *
minority rate	0.011	0.016	0.475	0.036	0.037	0.321	0.045	0.023	0.049 *	0.005	0.009	0.607	-0.001	0.005	0.782	-0.006	0.003	0.042 *
elderly rate	-0.029	0.026	0.262	-0.022	0.044	0.614	0.048	0.035	0.161	-0.015	0.012	0.211	-0.022	0.009	0.011 *	-0.007	0.005	0.147
savings	0.000	0.000	0.487	0.000	0.000	0.761	0.000	0.000	0.354	0.000	0.000	0.534	0.000	0.000	0.919	0.000	0.000	0.132
liabilities	-0.002	0.001	0.109	0.000	0.002	0.847	0.003	0.002	0.101	0.000	0.001	0.714	0.000	0.000	0.967	0.000	0.000	0.525
yearly incomes	0.000	0.000	0.957	-0.001	0.001	0.079	-0.001	0.000	0.006 **	0.000	0.000	0.355	0.000	0.000	0.118	0.000	0.000	0.463
employment rate	-0.028	0.036	0.439	-0.362	0.111	0.001 **	-0.130	0.061	0.034 *	-0.004	0.024	0.864	0.000	0.011	0.975	-0.003	0.005	0.512
male temporary employment rate	0.102	0.147	0.486	0.304	0.328	0.354	0.160	0.271	0.556	0.073	0.071	0.307	0.015	0.046	0.746	0.022	0.027	0.405
female temporary employment rate	-0.117	0.067	0.082	-0.062	0.157	0.695	-0.225	0.095	0.018 *	-0.060	0.035	0.081	-0.018	0.022	0.408	-0.001	0.013	0.933
long-term Care Insurance	0.000	0.005	0.926	-0.041	0.015	0.006 **	-0.039	0.009	0.000 **	-0.002	0.002	0.314	-0.001	0.001	0.369	-0.001	0.001	0.124
complete unemployment rate	0.307	0.069	0.000 **	1.276	0.205	0.000 **	1.091	0.094	0.000 **	0.142	0.046	0.002 **	0.073	0.028	0.008 **	0.014	0.011	0.206
X² value	212.45		<0.001 **	443.467		<0.001 **	445.867		<0.001 **	160.30		<0.001 **	89.121		<0.001 **	67.518		<0.001 **

*:P<0.05 and **P<0.01 by hierarchal linear regression model analysis.

Supplementary Table S4: Impacts of dual-income household rate, other household and social factors on suicide mortalities of Male caused by motives associated with family-, health-, economy-, employment-, romance- and school-related problems between 2009 and 2017.

Factors	family β	SE	P value	health β	SE	P value	economy β	SE	P value	employment β	SE	P value	romance β	SE	P value	school β	SE	P value
Model_1																		
dual-income rate	0.097	0.032	0.004 **	0.138	0.110	0.214	0.081	0.062	0.193	0.062	0.022	0.008 **	0.007	0.009	0.456	0.009	0.005	0.121
X² value	127.52		<0.001 **	231.92		<0.001 **	131.65		<0.001 **	107.60		<0.001 **	35.77		<0.001 **	39.61		<0.001 **
Model_2																		
dual-income rate	0.139	0.036	0.000 **	0.310	0.124	0.016 *	0.266	0.064	0.000 **	0.084	0.030	0.007 **	0.012	0.010	0.261	0.011	0.006	0.073
minority rate	0.024	0.026	0.352	0.058	0.053	0.275	0.082	0.044	0.062	0.028	0.027	0.307	0.007	0.009	0.463	0.002	0.006	0.761
elderly rate	-0.003	0.037	0.939	0.037	0.070	0.601	0.101	0.066	0.126	0.035	0.027	0.197	-0.004	0.015	0.781	0.006	0.007	0.418
savings	-0.001	0.001	0.311	0.001	0.003	0.800	0.005	0.003	0.114	0.000	0.001	0.830	-0.001	0.001	0.248	0.000	0.000	0.283
liabilities	0.000	0.000	0.640	-0.001	0.001	0.415	-0.001	0.001	0.262	0.000	0.000	0.399	0.000	0.000	0.859	0.000	0.000	0.042 *
yearly incomes	-0.001	0.000	0.082	-0.002	0.001	0.070	-0.002	0.001	0.011 *	0.000	0.000	0.415	0.000	0.000	0.043 *	0.000	0.000	0.124
employment rate	-0.082	0.054	0.130	-0.496	0.157	0.002 **	-0.264	0.118	0.025 *	-0.031	0.048	0.519	0.006	0.015	0.680	-0.008	0.008	0.369
male temporary employment rate	0.163	0.234	0.487	0.249	0.503	0.620	0.342	0.517	0.508	0.048	0.134	0.720	-0.009	0.055	0.870	0.075	0.050	0.136
female temporary employment rate	-0.135	0.105	0.200	-0.014	0.251	0.955	-0.430	0.184	0.020 *	-0.082	0.068	0.230	-0.005	0.026	0.840	-0.028	0.017	0.101
long-term Care Insurance	-0.006	0.007	0.404	-0.055	0.020	0.006 **	-0.074	0.017	0.000 **	-0.008	0.006	0.146	-0.001	0.001	0.333	-0.003	0.001	0.000 **
complete unemployment rate	0.392	0.110	0.000 **	1.396	0.297	0.000 **	2.058	0.194	0.000 **	0.272	0.083	0.001 **	0.103	0.032	0.002 **	0.026	0.020	0.202
X² value	202.97		<0.001 **	116.491		<0.001 **	440.071		<0.001 **	150.10		<0.001 **	74.487		<0.001 **	62.779		<0.001 **

*:P<0.05 and **P<0.01 by hierarchal linear regression model analysis.

Supplementary Table S5: Impacts of dual-income household rate, other household and social factors on suicide mortalities of Female caused by motives associated with family-, health-, economy-, employment-, romance- and school-related problems between 2009 and 2017.

Factors	family			health			economy			employment			romance			school		
	β	SE	P value	β	SE	P value	β	SE	P value	β	SE	P value	β	SE	P value	β	SE	P value
Model_1																		
dual-income rate	0.012	0.015	0.416	0.069	0.068	0.317	0.001	0.008	0.940	0.002	0.003	0.581	-0.014	0.004	0.001 **	0.005	0.002	0.019
X² value	61.14		<0.001 **	191.20		<0.001 **	51.67		<0.001 **	5.29		0.382	23.28		<0.001 **	6.13		0.294
Model_2																		
dual-income rate	0.046	0.017	0.009 **	0.233	0.070	0.002 **	0.021	0.009	0.024 *	0.006	0.005	0.210	-0.006	0.005	0.196	0.006	0.003	0.016
minority rate	-0.001	0.014	0.927	0.012	0.027	0.641	0.005	0.007	0.473	-0.005	0.004	0.205	0.003	0.006	0.605	-0.006	0.002	0.015
elderly rate	-0.057	0.024	0.018 *	-0.091	0.044	0.037 *	-0.006	0.011	0.560	-0.006	0.009	0.494	-0.016	0.009	0.087	-0.008	0.006	0.173
savings	0.001	0.000	0.054	-0.001	0.001	0.313	0.000	0.000	0.086	0.000	0.000	0.864	0.000	0.000	0.027 *	0.000	0.000	0.376
liabilities	0.000	0.000	0.033 *	0.000	0.000	0.481	0.000	0.000	0.983	0.000	0.000	0.863	0.000	0.000	0.317	0.000	0.000	0.069
yearly incomes	-0.002	0.001	0.093	0.000	0.002	0.872	0.001	0.001	0.314	0.000	0.000	0.768	0.000	0.000	0.780	0.000	0.000	0.525
employment rate	0.021	0.025	0.411	-0.178	0.084	0.034 *	-0.005	0.013	0.711	-0.002	0.006	0.754	-0.004	0.011	0.736	0.002	0.005	0.681
male temporary employment rate	0.050	0.112	0.654	0.368	0.249	0.141	0.006	0.062	0.917	0.044	0.029	0.129	0.033	0.044	0.460	0.028	0.021	0.175
female temporary employment rate	-0.106	0.054	0.051	-0.111	0.098	0.258	-0.040	0.027	0.134	-0.029	0.013	0.019	-0.039	0.019	0.042 *	-0.016	0.010	0.111
long-term Care Insurance	0.002	0.003	0.451	-0.026	0.011	0.021 *	-0.002	0.002	0.271	-0.002	0.001	0.154	-0.002	0.001	0.168	0.000	0.001	0.864
complete unemployment rate	0.200	0.053	0.000 **	1.191	0.152	0.000 **	0.180	0.024	0.000 **	0.026	0.019	0.178	0.044	0.027	0.098	0.004	0.010	0.691
X² value	107.67		<0.001 **	369.365		<0.001 **	135.276		<0.001 **	18.19		0.253	59.876		<0.001 **	21.611		0.118

*:P<0.05 and **P<0.01 by hierarchal linear regression model analysis.

Supplementary Table S6: Impacts of dual-income household rate, other household and social factors on age-dependent suicide mortalities of Male+Female between 2009 and 2017.

Factors	10s			20s			30s			40s			50s			60s			70s			80s		
	β	SE	P value	β	SE	P value	β	SE	P value	β	SE	P value	β	SE	P value	β	SE	P value	β	SE	P value	β	SE	P value
Model_1																								
dual-income rate	0.012	0.020	0.566	0.172	0.088	0.056	0.155	0.093	0.103	0.184	0.101	0.075	0.043	0.123	0.726	0.108	0.092	0.244	0.307	0.095	0.002 **	0.706	0.148	0.000 **
X² value	21.58		0.001 *	47.63		<0.001 **	100.26		<0.001 **	93.83		<0.001 **	119.95		<0.001 **	140.27		<0.001 **	133.18		<0.001 **	271.48		<0.001 **
Model_2																								
dual-income rate	0.010	0.023	0.682	0.426	0.099	0.000 **	0.326	0.101	0.002 **	0.683	0.121	0.000 **	0.536	0.102	0.000 **	0.592	0.118	0.000 **	0.653	0.134	0.000 **	0.891	0.203	0.000 **
minority rate	-0.059	0.022	0.009 **	-0.128	0.072	0.074	0.122	0.059	0.038 *	0.019	0.082	0.816	0.163	0.105	0.123	0.115	0.082	0.160	0.070	0.088	0.426	-0.049	0.092	0.594
elderly rate	-0.058	0.036	0.103	-0.295	0.112	0.009 **	0.015	0.116	0.900	-0.235	0.127	0.065	-0.213	0.154	0.167	-0.053	0.110	0.632	-0.070	0.147	0.637	0.011	0.139	0.934
savings	0.000	0.000	0.730	0.000	0.001	0.823	-0.002	0.001	0.005 **	-0.001	0.001	0.622	-0.001	0.001	0.422	-0.002	0.001	0.112	0.000	0.001	0.858	0.001	0.001	0.571
liabilities	0.000	0.001	0.981	0.004	0.005	0.374	0.008	0.004	0.052	-0.004	0.005	0.428	0.002	0.006	0.741	0.006	0.006	0.272	0.006	0.006	0.342	0.000	0.006	0.984
yearly incomes	0.000	0.000	0.735	0.000	0.002	0.812	-0.003	0.001	0.025 *	0.000	0.001	0.833	-0.002	0.002	0.227	-0.001	0.001	0.391	-0.002	0.002	0.221	-0.002	0.002	0.341
employment rate	0.048	0.033	0.149	0.217	0.137	0.113	0.031	0.111	0.782	0.085	0.178	0.634	0.059	0.232	0.800	0.039	0.166	0.812	-0.356	0.274	0.195			
male temporary employment rate	0.048	0.157	0.759	-0.288	0.608	0.636	-0.133	0.581	0.819	0.756	0.642	0.240	-1.378	0.700	0.050 *	0.010	0.842	0.991	-0.383	0.663	0.564	-0.727	0.648	0.262
female temporary employment rate	-0.078	0.065	0.233	-0.563	0.319	0.078	-0.653	0.292	0.026 *	-0.923	0.375	0.014 *	0.158	0.329	0.632	-0.355	0.403	0.378	0.125	0.369	0.735	-0.303	0.403	0.452
long-term Care Insurance	-0.002	0.004	0.614	0.001	0.018	0.964	-0.019	0.016	0.227	-0.030	0.024	0.201	-0.004	0.030	0.883	-0.019	0.024	0.421	0.037	0.028	0.180	-0.027	0.029	0.346
complete unemployment rate	-0.001	0.083	0.991	2.310	0.385	0.000 **	2.322	0.333	0.000 **	4.220	0.420	0.000 **	4.603	0.382	0.000 **	4.972	0.407	0.000 **	3.152	0.478	0.000 **	2.368	0.471	0.000 **
X² value	36.26		0.002	152.952		<0.001 **	253.543		<0.001 **	325.36		<0.001 **	360.164		<0.001 **	457.406		<0.001 **	248.05		<0.001 **	364.238		<0.001 **

*:P<0.05 and **P<0.01 by hierarchal linear regression model analysis.

Supplementary Table S7: Impacts of dual-income household rate, other household and social factors on age-dependent suicide mortalities of Male between 2009 and 2017.

Factors	10s β	SE	P value	20s β	SE	P value	30s β	SE	P value	40s β	SE	P value	50s β	SE	P value	60s β	SE	P value	70s β	SE	P value	80s β	SE	P value
Model_1																								
dual-income rate	0.022	0.027	0.415	0.390	0.139	0.007 **	0.250	0.152	0.107	0.352	0.160	0.033 *	0.258	0.181	0.162	0.061	0.165	0.713	0.205	0.152	0.184	0.779	0.246	0.003 **
X² value	10.09		0.073	50.55		<0.001 **	61.41		<0.001 **	104.57		<0.001 **	86.08		<0.001 **	119.32		<0.001 **	88.52		<0.001 **	126.76		<0.001 **
Model_2																								
dual-income rate	0.033	0.034	0.327	0.716	0.142	0.000 **	0.363	0.155	0.024 *	0.840	0.173	0.000 **	0.863	0.156	0.000 **	0.694	0.161	0.000 **	0.608	0.159	0.000 **	1.203	0.257	0.000 **
minority rate	-0.075	0.031	0.018	-0.210	0.128	0.100	-0.057	0.110	0.604	0.119	0.149	0.426	0.180	0.151	0.236	0.143	0.110	0.197	0.161	0.163	0.322	0.193	0.170	0.257
elderly rate	-0.107	0.051	0.035	-0.561	0.180	0.002 **	0.098	0.184	0.595	-0.151	0.238	0.526	-0.416	0.281	0.140	0.004	0.213	0.985	0.027	0.199	0.891	-0.124	0.247	0.616
savings	0.000	0.000	0.741	0.001	0.002	0.552	-0.001	0.002	0.547	-0.006	0.002	0.004 **	-0.005	0.002	0.009 **	-0.004	0.002	0.010 **	-0.003	0.002	0.195	-0.004	0.003	0.228
liabilities	0.001	0.002	0.698	0.000	0.008	0.972	-0.007	0.007	0.306	0.024	0.009	0.006 **	0.022	0.010	0.036 *	0.008	0.007	0.255	0.000	0.009	0.997	-0.008	0.013	0.519
yearly incomes	0.000	0.001	0.946	0.000	0.002	0.900	-0.002	0.002	0.379	-0.007	0.003	0.025 *	-0.010	0.003	0.002 **	-0.006	0.002	0.019 *	-0.006	0.003	0.055	-0.003	0.004	0.401
employment rate	0.043	0.054	0.428	0.326	0.248	0.189	0.249	0.194	0.200	0.156	0.252	0.537	0.131	0.338	0.698	-0.296	0.338	0.380	-0.178	0.297	0.549	-0.015	0.416	0.971
male temporary employment rate	-0.019	0.222	0.933	-0.879	1.011	0.385	-2.192	0.938	0.020 *	-0.670	1.127	0.553	-2.849	1.541	0.065	-0.226	1.007	0.823	-1.044	1.193	0.382	-0.196	1.931	0.919
female temporary employment rate	-0.114	0.110	0.298	-0.548	0.576	0.342	-0.145	0.479	0.762	-0.488	0.535	0.362	0.446	0.686	0.515	-0.492	0.508	0.333	0.160	0.653	0.807	-0.270	0.872	0.757
long-term Care Insurance	-0.002	0.006	0.793	0.022	0.030	0.464	0.020	0.022	0.375	0.001	0.037	0.988	0.010	0.043	0.817	-0.056	0.037	0.126	0.015	0.045	0.742	0.083	0.054	0.122
complete unemployment rate	0.012	0.123	0.923	2.655	0.562	0.000 **	2.426	0.557	0.000 **	5.598	0.506	0.000 **	6.133	0.652	0.000 **	6.427	0.577	0.000 **	4.244	0.592	0.000 **	3.232	0.909	0.000 **
X² value	23.04		0.083	116.491		<0.001 **	497.697		<0.001 **	286.04		<0.001 **	275.239		<0.001 **	401.321		<0.001 **	201.44		<0.001 **	174.275		<0.001 **

*:P<0.05 and **P<0.01 by hierarchal linear regression model analysis.

Supplementary Table S8: Impacts of dual-income household rate, other household and social factors on age-dependent suicide mortalities of Female between 2009 and 2017.

Factors	10s β	SE	P value	20s β	SE	P value	30s β	SE	P value	40s β	SE	P value	50s β	SE	P value	60s β	SE	P value	70s β	SE	P value	80s β	SE	P value
Model_1																								
dual-income rate	-0.002	0.017	0.910	-0.119	0.069	0.089	-0.106	0.044	0.020 *	-0.158	0.059	0.010 **	-0.143	0.068	0.042 *	0.082	0.059	0.169	0.347	0.102	0.001 **	0.532	0.126	0.000 **
X² value	5.83		0.323	25.81		<0.001 **	55.00		<0.001 **	53.47		<0.001 **	33.36		<0.001 **	63.65		<0.001 **	97.30		<0.001 **	195.56		<0.001 **
Model_2																								
dual-income rate	-0.016	0.021	0.460	0.093	0.078	0.236	0.107	0.059	0.075	0.117	0.082	0.159	-0.009	0.075	0.910	0.325	0.081	0.000 **	0.695	0.186	0.001 **	0.748	0.179	0.000 **
minority rate	-0.047	0.017	0.005	-0.016	0.083	0.845	0.027	0.081	0.741	-0.153	0.069	0.027 *	0.014	0.089	0.877	-0.115	0.062	0.065	0.056	0.088	0.525	0.306	0.106	0.004 **
elderly rate	-0.010	0.035	0.773	0.007	0.134	0.958	-0.088	0.097	0.365	-0.243	0.112	0.031 *	0.016	0.148	0.916	-0.261	0.114	0.023 *	-0.206	0.164	0.209	-0.099	0.167	0.554
savings	0.000	0.000	0.375	0.000	0.001	0.813	0.000	0.001	0.923	0.000	0.001	0.885	0.000	0.001	0.765	0.000	0.001	0.825	-0.001	0.002	0.616	-0.002	0.001	0.250
liabilities	0.000	0.000	0.246	-0.001	0.001	0.492	0.001	0.001	0.514	0.002	0.001	0.027 *	0.000	0.001	0.772	-0.001	0.001	0.266	0.001	0.001	0.615	0.000	0.001	0.975
yearly incomes	0.000	0.001	0.979	0.011	0.004	0.014 *	0.003	0.004	0.494	0.000	0.005	0.992	-0.003	0.005	0.513	0.002	0.005	0.699	-0.009	0.006	0.135	0.007	0.006	0.281
employment rate	0.041	0.027	0.130	0.039	0.116	0.736	0.119	0.103	0.246	0.048	0.117	0.682	0.084	0.157	0.593	0.227	0.150	0.129	0.121	0.208	0.562	-0.432	0.243	0.077
male temporary employment rate	0.098	0.129	0.448	0.212	0.493	0.668	-0.312	0.513	0.544	-0.046	0.485	0.925	-0.152	0.430	0.724	0.222	0.444	0.618	-0.615	0.709	0.386	0.054	0.638	0.933
female temporary employment rate	-0.040	0.049	0.418	-0.437	0.265	0.100	0.087	0.206	0.672	-0.044	0.241	0.856	0.036	0.216	0.867	-0.325	0.249	0.193	0.303	0.409	0.459	-0.106	0.383	0.782
long-term Care Insurance	-0.003	0.003	0.403	-0.007	0.014	0.597	-0.008	0.010	0.415	-0.012	0.015	0.438	0.002	0.016	0.888	-0.009	0.017	0.581	-0.016	0.030	0.600	-0.084	0.030	0.005 **
complete unemployment rate	-0.035	0.061	0.566	2.005	0.370	0.000 **	1.957	0.276	0.000 **	2.053	0.272	0.000 **	1.500	0.268	0.000 **	2.226	0.309	0.000 **	2.408	0.461	0.000 **	2.427	0.560	0.000 **
X² value	18.41		0.242	93.947		<0.001 **	131.279		<0.001 **	142.94		<0.001 **	74.926		<0.001 **	158.901		<0.001 **	171.42		<0.001 **	295.963		<0.001 **

*:P<0.05 and **P<0.01 by hierarchal linear regression model analysis.