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Risk Aversion at the Country Level[1]

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Abstract

In this paper the authors estimate the coefficient of relative risk aversion for 75 countries using data on self-reports of personal well-being from the Gallup World Poll. Their analysis suggests that the coefficient of relative risk aversion varies closely around one, which corresponds to a logarithmic utility function. The authors conclude that their results support the use of the log utility function in numerical simulations.

JEL codes: D80, D31, I31, O57.

Keywords: relative risk aversion; happiness; personal well-being.

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At the individual level, risk attitudes underlie economic decisions about the optimal amount of retirement or precautionary savings, investment in human capital, public or private sector employment, and entrepreneurship, among others. In the aggregate, these micro-level decisions can influence a country's growth and development outcomes.

Although there is a vast literature on measuring risk aversion, there is not yet a commonly accepted estimate. Probably the most commonly accepted measures of the coefficient of relative risk aversion lie between 1 and 3, but there is a wide range of estimates in the literature—from as low as 0.2 to 10 and higher.[4] The most common approach to measure risk aversion is based on a consumption-based capital asset pricing model (CAPM). Hansen and Singleton (1982), using the generalized method of moments report that relative risk aversion is small. Hall (1988) shows that with minor changes in the specification and instruments the results vary substantially. Neely et al. (2001), in turn, explain this difference arguing that estimations based on CAPM fail to provide robust estimations because difficulties in predicting consumption growth and asset returns from available instruments lead to a near identification failure of the model. In this article we follow a different approach.

We build on the methodology first outlined in Layard et al. (2008). The authors use happiness data to estimate how fast the marginal utility of income declines as income increases using an iterated maximum likelihood procedure, assuming a constant relative risk aversion (CRRA) utility function. Under this assumption, the elasticity of the marginal utility of income corresponds to the parameter of relative risk aversion. Gandelman and Hernández-Murillo (2013) also used this methodology to estimate the coefficient of relative risk aversion using pooled data from cross-sectional and panel data sets. Instead of maximum likelihood, here we use the generalized method of moments (GMM) to perform the estimation. As with maximum likelihood, GMM provides consistent and asymptotically normal estimates, but it does not rely on the normality assumption. Using GMM also provides asymptotically correct standard errors for the coefficient of relative risk aversion, whereas the iterated maximum likelihood procedure used by Layard et al. (2008) and Gandelman and Hernández-Murillo (2013) does not easily provide a measure of the standard error of the parameter of interest.

[4] See Chetty (2006), Campo et al. (2011), Friend and Blume (1975), Gandelman and Hernández-Murillo (2013), Garcia et al. (2003), Gordon and St-Amour (2004), Hansen and Singleton (1983), Kapteyn and Teppa (2011), Layard et al. (2008), Mankiw (1985), Szpiro (1986), and Weber (1975).

The CRRA utility function is often used in applied theory and empirical work because of its tractability and appealing implications.[5] The CRRA form, nevertheless, has been subjected to various criticisms. For example, Geweke (2001) warns about the potential limitations of assuming a CRRA function for traditional growth models. He argues that, under the CCRA assumption, the existence of expected utility, and hence of an operational theory of choice, depends on distributional assumptions on macroeconomic variables and about prior information that do not necessarily hold. Because many distributions are difficult to distinguish econometrically, these assumptions may lead to widely different implications for choice under uncertainty. Another potential limitation of the standard CRRA form is that, in dynamic models with a CRRA per-period utility function with time-separable preferences, the coefficient of relative risk aversion is also the reciprocal of the elasticity of intertemporal substitution (EIS). Epstein and Zin (1989, 1991) addressed this issue with a generalization of the standard preferences in a recursive representation in which current utility is a constant elasticity function of current consumption and future utility. This more flexible utility representation allows for the differentiation of the coefficient of relative risk aversion from the EIS and is useful to explain problematic aspects of asset pricing behavior.[6] We acknowledge these criticisms, but we follow the happiness literature in assuming a CRRA form for the utility function because it provides a straightforward framework that can be used to recover a measure of risk aversion summarized in a single parameter. This simple form is particularly useful when, as is our case, the only available data are cross-sectional observations on subjective well-being and income.

In estimating risk aversion, the literature has focused almost exclusively on developed countries.[7] Moreover, with the exception of Szpiro (1986) and Szpiro and Outreville (1988), to the best of our knowledge, no additional study has yet applied a homogenous methodology for estimating risk aversion to a large set of countries comprising both high- and low-income countries. Szpiro (1986) initially used property/liability insurance data to estimate relative risk aversion for 15 developed countries. Szpiro and Outreville (1988) augmented the analysis to 31 countries,

[5] For example, the CRRA utility form implies stationary risk premia and interest rates even in the presence of long-run economic growth. See Mehra (2011) for additional discussions on the implications on the equity premium.

[6] See Kocherlakota (1990) for a criticism of the Epstein-Zin approach and Kocherlakota (1996) for a more in-depth analysis and its implication for the equity premium puzzle.

[7] For an exception, see Gandelman and Hernández-Murillo (2013) that estimates measures of risk aversion for groups of countries classified by income level.

including 11 developing countries. On a slightly different approach, Gandelman and Porzecanski (2013) use different assumptions of relative risk aversion to calibrate how much happiness inequality is due to income inequality using a sample of 117 developing and developed countries from the Gallup World Poll.

In this article, we fill this gap by eliciting risk aversion measures for 75 countries, including 52 developing countries, from self-reports of personal well-being from the 2006 Gallup World Poll. This study is important for several reasons. First, the replication of the same methodology for different countries is useful to assess the robustness of the estimates. Second, it is a starting point for the study of cross-country differences in risk aversion and their correlation with multiple variables of interest. Third, dynamic stochastic general equilibrium models often rely on calibrated estimates of risk aversion from developed countries, and usually there are no measures of the relevant parameters for developing countries.

Our estimates show that individual country estimates vary between 0 (implying a linear utility function) and 3 (implying more risk aversion than log utility). We construct Wald tests for the null hypotheses that the coefficient of relative risk aversion equals 0, 1, or 2. A coefficient of 0 indicates a linear utility function in terms of income; a coefficient of 1 indicates a logarithmic utility function; and finally a coefficient of 2 corresponds to a value often used in the literature, which indicates a higher degree of concavity.[8] Among the developed countries in the sample, we reject the null hypothesis that the coefficient of relative risk aversion equals 1 for only 2 of the 23 developed countries. In most cases, we also reject that the coefficient equals 0, and similarly we reject that the coefficient equals 2. Among the 52 developing countries in the sample, we reject the null hypothesis that the coefficient of relative risk aversion equals 1 only in 10 countries. In several cases, we also reject the null hypothesis that the coefficient is equal to 0, and similarly, we reject that the coefficient equals 2. An analysis of the distribution of the estimates further indicates that for both developed and developing countries, most of the estimates are concentrated in the vicinity of 1. We conclude that this result supports the use of the log utility function in numerical simulations.

[8] The log utility function has the property that in a trade-off between present and future consumption the income and substitution effects, in response to changes in the interest rate, exactly offset.

1. Data

The main variables of interest in the Gallup World Poll are self-reports of satisfaction with life and household income.[9] We also use additional individual controls such as age, gender, marital status, employment status, and residence in urban areas.

The relevant question in the Gallup World Poll reads "*Please imagine a ladder/mountain with steps numbered from zero at the bottom to ten at the top. Suppose we say that the top of the ladder/mountain represents the best possible life for you and the bottom of the ladder/mountain represents the worst possible life for you. If the top step is 10 and the bottom step is 0, on which step of the ladder/mountain do you feel you personally stand at the present time?*" The responses to this question constitute our measure of reported well-being, and henceforth we do not distinguish it from happiness.

Table 1 reports summary statistics for the key variables in our estimations, including the happiness scores, individual income, and the control variables. We used data from 75 countries and 40,655 individual observations. We split the sample into developing and developed countries, following the World Bank criterion: A country is defined as developing if gross national income per capita is less than $12,000 U.S. dollars in 2010. According to this definition, the sample includes 52 developing countries and 23 developed countries.

The table reports statistics of country averages for the overall sample and for each of the two country classifications.[10] The mean of individual country averages of reported happiness is 5.5 in the 0–10 scale for the overall sample, 6.7 for developed countries, and 4.9 for developing countries. In terms of the control variables, the overall sample includes adult individuals with an average age of 42.4 years, slightly more women (55.6 percent) than men (44.4 percent), more married (69.1 percent) than single individuals (30.9 percent), less than half who live in an urban setting (44.6 percent), and about 59.9 percent who are employed. Comparing developed and developing countries, sampled individuals in developed countries tend to include older people (44.7 years of age on average compared with 41.3 in developing countries), a slightly larger percentage of women (58.0 percent compared with 54.5 percent), and a higher percentage of employed individuals (71.6 percent compared with 54.7 percent). The

[9] Household income data are reported in twenty nine brackets. We use the midpoint of the bracket as the measure of income, and for the top bracket we use a value equal to twice the previous midpoint value. In our estimations income is expressed in deviations from the country average. This normalization facilitates the numerical estimation and has no effect on the estimates of the risk aversion coefficient.

[10] The reported income means differ from 100 percent because we trimmed outlier observations from the sample.

samples for developed and developing countries include about the same percentages of married individuals, while slightly more people live in an urban setting in developing countries than in developed countries (45.3 percent compared with 42.9 percent).

2 Estimation

To perform the estimation we have to make several assumptions. First, we need to make an assumption about the form of the utility function. Second, because consumption data are not available, we have to assume that the utility function can be expressed in terms of income. Furthermore, the measure of income typically available in happiness surveys (including the GWP) is current household income, as opposed to permanent individual income, and therefore the utility function we estimate represents per-period utility instead of lifetime utility. Finally, because we are using self-reports of well-being as a proxy for utility, we have to make assumptions about the comparability of the responses across individuals.

2.1 Utility function

We assume that an individual's experienced utility u can be explained, in addition to income y, by a (row) vector of individual characteristics x via a function U: $u=U(y,\boldsymbol{x})$. We assume that the relation U is common to all individuals in a given country and is of the following form:

$$u = U(y, x) = \alpha + \gamma g(y) + x\beta \,, \tag{1}$$

where α and γ are scalars and β is a column vector of the coefficients for the controls x, and g is a constant relative risk aversion (CRRA) function for the relation with income

$$g(y) = \begin{cases} \dfrac{y^{1-\rho} - 1}{1-\rho} & \text{if} \quad \rho \neq 1 \\ \log(y) & \text{if} \quad \rho = 1 \end{cases}, \tag{2}$$

where ρ corresponds to the Arrow-Pratt coefficient of relative risk aversion. According to this specification, income enters the utility function as a proxy for consumption. In other words, this specification assumes that the effect of income on reported happiness corresponds to the causal effects of consumption on utility. While we follow previous studies in making this assumption, we recognize that it is not trivial and we acknowledge its potential limitations.[11]

We also assume that reported happiness, h, is linked to experienced utility via a monotonically increasing function f: $h = f(u)$.[12] For simplicity, as in most of the literature, we assume that the relation f is common to all individuals. Furthermore, we assume that reported happiness scores are cardinally comparable across individuals, which implies that the relation f is linear. The cardinality assumption justifies the estimation with ordinary least squares (OLS) as in Layard et al. (2008) and Gandelman and Hernández-Murillo (2013). Alternatively, assuming that happiness scores are ordinally comparable would justify the estimation with ordered probit or ordered logit. Ferrer-i-Carbonell and Frijters (2004) describe that the results with either assumption are indistinguishable in most studies using cross-sectional data sets, and OLS estimates are easier to interpret, so this method is often preferred. The results may differ when using panel data, however, if time-invariant effects are important. Therefore, Ferrer-i-Carbonell and Frijters (2004) argue that one can practically assume that happiness scores are *both* cardinally and ordinally interpersonally comparable.

Layard et al. (2008) studied the implications of relaxing the linearity assumption on f. They were concerned especially that the bounded happiness scale would induce compression of the responses, particularly at the top of the scale. The authors found a small degree of concavity near the top of the scale, which implies that the estimate of the coefficient of interest may be biased upward under the linearity assumption. However, the authors determined that relaxing the linearity assumption had only a small effect on their conclusions, and therefore we maintain this assumption in our exercise.

2.2 Estimation: happiness and utility

The estimated equation for a representative country is therefore

$$h_i = \alpha + \gamma g(y_i) + x_i \beta + v_i , \tag{2}$$

where $i = 1, \cdots, n$ indexes individuals, h_i is the index of reported happiness (in the scale 0–10), and v_i represents an error term that is independent of experienced utility, u_i.

[11] Further discussion on this topic can be found in Clark, Frijters, and Shields (2008) and the references therein.

[12] For this discussion we follow loosely the notation of MacKerron (2011).

We estimate the model with GMM. Stacking the individual observations, and letting $\boldsymbol{h} = (h_1, h_2, \cdots, h_n)'$, the estimated equation is a nonlinear vector-valued function, $H: R^{K+3} \rightarrow R^n$, of the parameters $\theta = (\alpha, \gamma, \rho, \beta')'$, $\boldsymbol{h} = H(\theta)$, with β a $(K \times 1)$ vector of coefficients for the control variables x_i. Because of the CRRA assumption, we have more parameters than independent variables, so we need an appropriate set of instruments to conduct the estimation. Following Stewart (2011), we construct the set of instruments taking advantage of the nonlinearity of the specification as $Z = [J(\theta), X]$.[13] $J(\theta)$ is the $n \times (K+3)$ Jacobian matrix of first derivatives of the function H with respect to the parameter vector θ, where each row corresponds to the vector $(1, g(y_i), \gamma m(y_i), x_i)$, and $m(y_i) = \frac{\partial g(y_i)}{\partial \rho}$; X is the $n \times (K+2)$ data matrix, where each row corresponds to the vector $(1, y_i, x_i)$. Therefore, the matrix of instruments Z simplifies to a matrix with the following characteristic row $z_i = (1, g(y_i), \gamma m(y_i), y_i, x_i)$.[14]

3 Results

Table 2 reports the estimates of the relative risk aversion coefficient for the 75 countries in our sample.[15] The estimates range between 0 and 3. The median and simple averages of the country estimates are 0.94 and 0.98, respectively. The average coefficient among developing countries is 1.00, while the average coefficient among developed countries is 0.92. For each country we report Wald tests of the null hypotheses that the coefficient of relative risk aversion equals 0, 1, or 2. The null hypothesis that ρ equals 0 is rejected at the 10 percent level in 13 of the 23 developed countries and 34 of the 52 developing countries. In turn, the null hypothesis that ρ equals 1 is rejected at the 10 percent level in 2 developed countries and 10 developing countries. Finally, the null hypothesis that ρ equals 2 is rejected at the 10 percent level in 17 developed countries and 36 developing countries.

[13] In order to be sure that our results are not affected by outliers in the income reports, we trim observations corresponding to the bottom and top 5 percent of the distribution of residuals from a regression of the log of relative income on individual controls, as in Layard et al. (2008).

[14] We implement the estimation in Stata version 12.0 using a wrapper function for the built-in procedure `gmm` where we provide the explicit derivatives of the moment conditions. The programs are available from the authors on request.

[15] We eliminated from the sample various developed and developing countries for which the estimation procedure did not find a value for ρ .

Figures 1 and 2 present the individual country estimates of the coefficient of relative risk aversion for developed and developing countries, respectively. The plots include 90 percent confidence intervals. The plots again indicate, that for most of the middle of the distribution of estimates, we cannot reject that the coefficient is equal to 1. This conclusion is confirmed by a plot of the kernel density estimators in Figure 3, which indicates that most of the estimates for both developed and developing countries are concentrated in the vicinity of 1. The distribution of estimates for developed countries also seems to contain relatively more mass of observations between 0 and 0.5, compared with the distribution for developing countries, while the latter seems to contain relatively more observations around 2.

4 Conclusions

The financial economics literature has made a significant effort in finding adequate measures of risk aversion, but in general it has focused on providing estimates for a limited set of mostly developed countries. Szpiro and Outreville (1988), for example, study 31 countries, including only 11 developing countries. Their methodology uses insurance data and primarily tests the hypothesis of constant relative risk aversion, which cannot be rejected for the majority of countries considered. In this paper, we modify the methodology of Layard et al. (2008) and Gandelman and Hernández-Murillo (2013) to estimate the coefficient of relative risk aversion using subjective well-being data for 75 countries, including 52 developing countries.

Our individual country estimates range from 0 to 3, with an average of 0.98. Wald tests indicate that the coefficient of relative risk aversion is smaller than 2 for the vast majority of countries and in the vicinity of 1. These estimates of relative risk aversion are smaller than those found for individual countries by Szpiro and Outreville (1988); their estimates vary between 1 and 5, with an average of 2.89. Our estimates are close to the results of Layard et al. (2008) and Gandelman and Hernández-Murillo (2013).

Many economic models, including dynamic general stochastic equilibrium models require estimates of key parameters, including the coefficient of relative risk aversion. Our findings support the use of the log form for the utility function in these exercises, corresponding to a coefficient of unity for the coefficient of relative risk aversion. Our results also inform the construction of models in which it is important to allow for different parameterizations for developing and developed countries.

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Table 1. Summary Statistics															
	All countries					Developed countries					Developing countries				
variable	No. of countries	mean	standard deviation	min	max	No. of countries	mean	standard deviation	min	max	No. of countries	mean	standard deviation	min	max
No. of respondents	75	542	150	230	1241	23	552	95	418	867	52	538	170	230	1241
Happiness	75	5.5	1.2	3.4	7.8	23	6.7	0.8	5.3	7.8	52	4.9	0.8	3.4	7.2
Income	75	92.3%	8.6%	47.1%	109.8%	23	97.8%	3.5%	91.0%	101.7%	52	89.9%	9.1%	47.1%	109.8%
Age	75	42.4	2.8	36.3	47.7	23	44.7	1.5	42.0	47.7	52	41.3	2.7	36.3	46.9
Female	75	55.6%	6.4%	42.4%	72.2%	23	58.0%	6.1%	49.3%	72.2%	52	54.5%	6.4%	42.4%	69.2%
Married	75	69.1%	10.0%	36.2%	90.2%	23	68.9%	6.5%	55.6%	82.8%	52	69.3%	11.2%	36.2%	90.2%
Urban	75	44.6%	19.2%	5.0%	87.4%	23	42.9%	15.0%	24.6%	75.8%	52	45.3%	20.9%	5.0%	87.4%
Employed	75	59.9%	14.0%	23.7%	88.3%	23	71.6%	9.4%	52.6%	88.3%	52	54.7%	12.6%	23.7%	86.9%

Notes

1) Reported statistics are arithmetic averages of the individual country statistics; e.g., the mean is the average of the country means, and the standard deviation is the average of the country standard deviations.

2) Developed countries are countries with Gross National Income (GNI) per capita greater than $12,000 USD in 2010.

3) Statistics are for the country averages of the variable.

4) Income is expressed relative to the country average. The mean does not equal 100 percent because outlier observations were trimmed.

Table 2. Relative Risk Aversion by Country

Developed countries

	Country	ρ	χ^2 H_0: ρ=0.	χ^2 H_0: ρ=1.	χ^2 H_0: ρ=2.	No. Obs.
1	Australia	1.17	**21.86***	0.47	**10.93***	594
2	Austria	1.08	**2.84***	0.02	2.03	465
3	Belgium	1.55	**7.20***	0.92	0.59	533
4	Canada	0.83	**7.01***	0.31	**14.12***	867
5	Croatia	0.31	0.23	1.16	**6.92***	489
6	Estonia	0.51	1.70	1.58	**14.56***	488
7	Finland	0.57	1.22	0.70	**7.73***	433
8	France	1.43	2.08	0.19	0.33	490
9	Germany	0.77	**6.06***	0.53	**15.35***	630
10	Greece	1.08	**6.32***	0.03	**4.61***	555
11	Ireland	0.35	0.27	0.91	**5.87***	443
12	Japan	0.44	1.19	1.85	**14.55***	550
13	Korea	0.27	0.61	**4.53***	**25.38***	604
14	Netherlands	0.10	0.02	1.36	**6.08***	531
15	New Zealand	1.15	**8.75***	0.16	**4.70***	565
16	Norway	1.16	2.29	0.05	1.18	647
17	Poland	0.38	0.62	1.62	**11.11***	513
18	Portugal	1.07	**9.91***	0.04	**7.44***	418
19	Slovenia	0.83	**7.49***	0.33	**15.07***	527
20	Switzerland	1.21	**3.69***	0.11	1.59	528
21	Taiwan	2.45	**16.88***	**5.91***	0.57	566
22	United Kingdom	1.03	**17.71***	0.01	**15.85***	640
23	United States	1.39	**18.85***	1.48	**3.64***	610

Developing countries

	Country	ρ	χ^2 H_0: ρ=0.	χ^2 H_0: ρ=1.	χ^2 H_0: ρ=2.	No. Obs.
1	Albania	0.14	0.24	**8.73***	**40.90***	453
2	Argentina	1.20	**4.03***	0.11	1.78	410
3	Armenia	0.57	2.12	1.21	**13.38***	520
4	Azerbaijan	1.85	**15.97***	**3.37***	0.10	565
5	Bangladesh	1.30	**11.51***	0.61	**3.34***	661
6	Belarus	0.09	0.02	1.66	**7.28***	528
7	Benin	0.21	0.30	**4.49***	**22.91***	467
8	Bolivia	0.16	0.16	**4.63***	**22.10***	450
9	Bosnia & Herzegovina	0.72	**6.84***	1.03	**21.60***	889
10	Botswana	0.94	**29.44***	0.12	**37.55***	453
11	Brazil	0.63	0.33	0.11	1.52	612
12	Bulgaria	1.06	**14.58***	0.04	**11.53***	466
13	Burundi	2.17	**4.06***	1.18	0.02	451
14	Cameroon	0.82	**3.41***	0.17	**7.18***	504
15	Chile	1.13	**20.56***	0.26	**12.38***	481
16	Dominican Republic	0.32	0.83	**3.68***	**22.53***	332
17	Ecuador	1.39	**5.87***	0.46	1.14	548
18	El Salvador	0.54	2.15	1.60	**15.94***	387
19	Georgia	0.88	**3.26***	0.06	**5.25***	541
20	Ghana	0.63	**4.40***	1.54	**20.97***	379
21	Honduras	0.91	**4.51***	0.05	**6.56***	230
22	India	0.92	1.28	0.01	1.76	1241
23	Indonesia	1.24	**9.70***	0.36	**3.70***	758
24	Kosovo	1.03	**6.15***	0.01	**5.46***	521
25	Kyrgyz Republic	1.81	**7.54***	1.50	0.09	564
26	Lao People's Dem.Rep	0.39	0.50	1.21	**8.44***	627

Developing coutries (contd)

	Country	ρ	χ2 H0: ρ=0.	χ2 H0: ρ=1.	χ2 H0: ρ=2.	No. Obs.
27	Lithuania	1.23	**18.51***	0.64	**7.27***	452
28	Macedonia, FYR	1.34	**15.43***	1.00	**3.71***	563
29	Madagascar	0.72	2.33	0.36	**7.45***	618
30	Malaysia	1.93	1.71	0.40	0.00	497
31	Mexico	0.78	1.22	0.10	**3.02***	469
32	Moldova	1.19	**8.58***	0.23	**3.91***	545
33	Montenegro	2.10	**11.38***	**3.14***	0.03	322
34	Mozambique	1.11	**19.22***	0.19	**12.38***	486
35	Myanmar	1.01	**10.72***	0.00	**10.28***	749
36	Panama	0.18	0.25	**4.83***	**23.92***	476
37	Paraguay	0.47	0.23	0.29	2.39	480
38	Peru	1.44	**6.72***	0.63	1.01	359
39	Russia	0.65	**5.02***	1.46	**21.69***	1,000
40	Senegal	1.89	**4.65***	1.03	0.02	407
41	Serbia	0.27	0.35	2.60	**14.54***	815
42	South Africa	1.29	**36.15***	1.79	**11.13***	458
43	Sri Lanka	0.68	**4.23***	0.91	**15.72***	692
44	Tajikistan	1.19	**4.96***	0.12	2.33	523
45	Tanzania	1.26	**7.11***	0.30	2.46	395
46	Uganda	0.67	**20.24***	**5.04***	**80.79***	497
47	Ukraine	0.44	0.44	0.69	**5.41***	564
48	Uruguay	0.90	**11.74***	0.15	**17.59***	485
49	Uzbekistan	2.96	**14.59***	**6.40***	1.54	551
50	Venezuela, Rep. Bol.	2.08	**11.13***	**2.99***	0.01	452
51	Vietnam	1.15	**18.74***	0.32	**10.18***	558
52	Zimbabwe	0.04	0.00	0.93	**3.88***	518

Notes

1) Developed countries are countries with Gross National Income (GNI) per capita greater than $12,000 USD in 2010.

2) The χ^2 statistics correspond to the Wald tests for the null hypotheses that ρ=0, ρ=1, or ρ=2.

3) The bold typeface and the asterisk indicate statistical significance at the 10% level.

4) No. Obs. = number of observations.

Figure 1. Relative Risk Aversion among Developed Countries

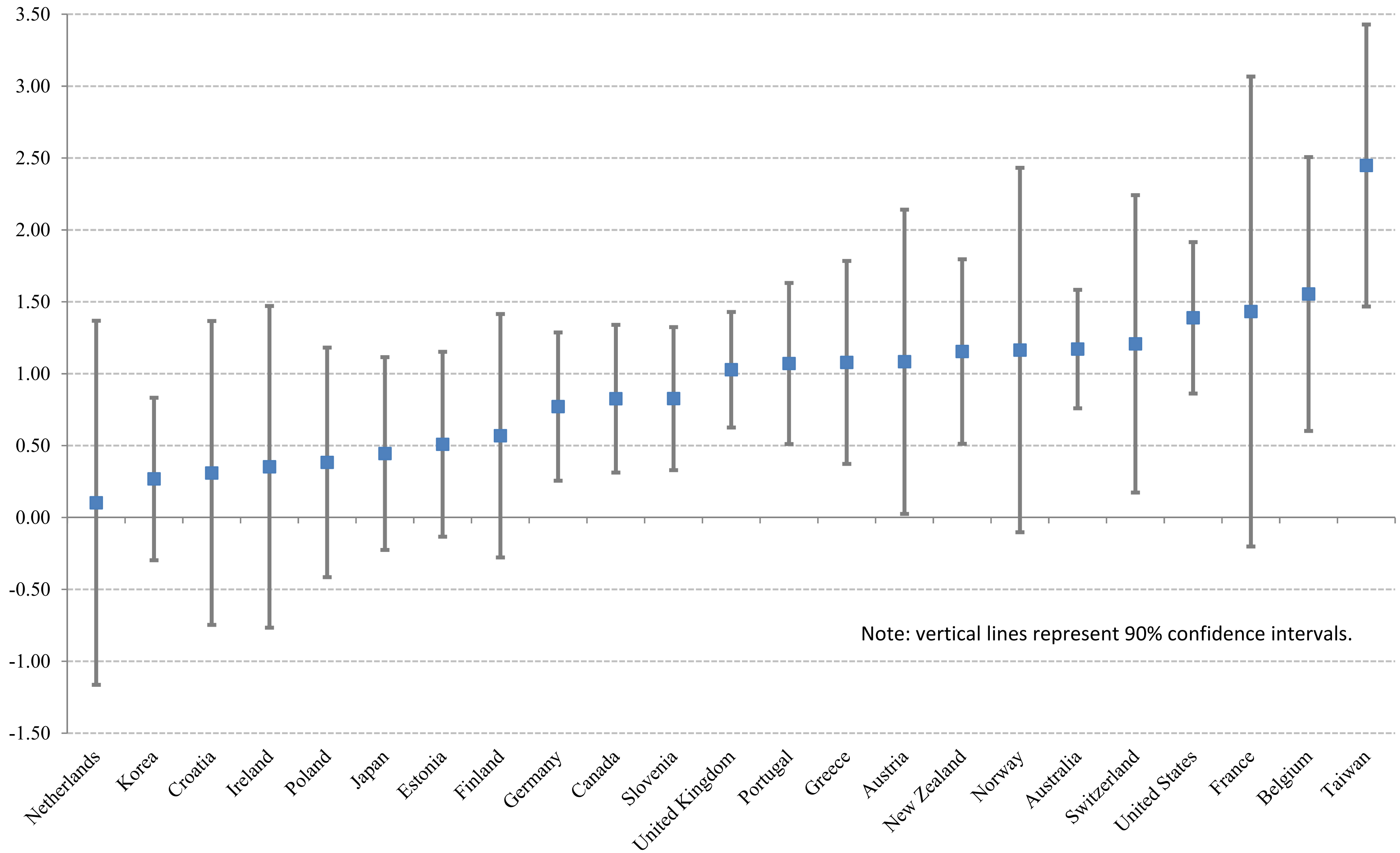
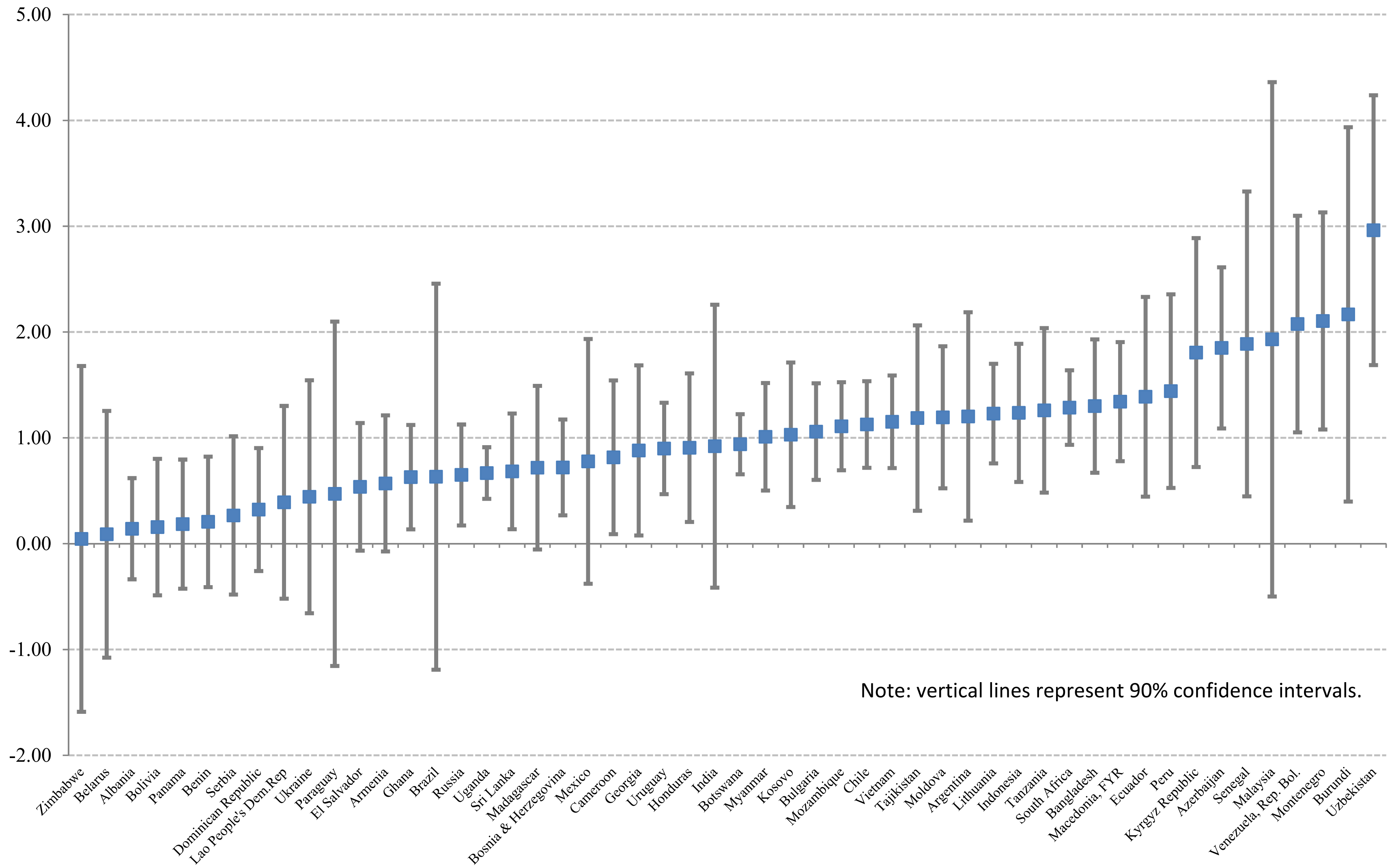


Figure 2. Relative Risk Aversion among Developing Countries



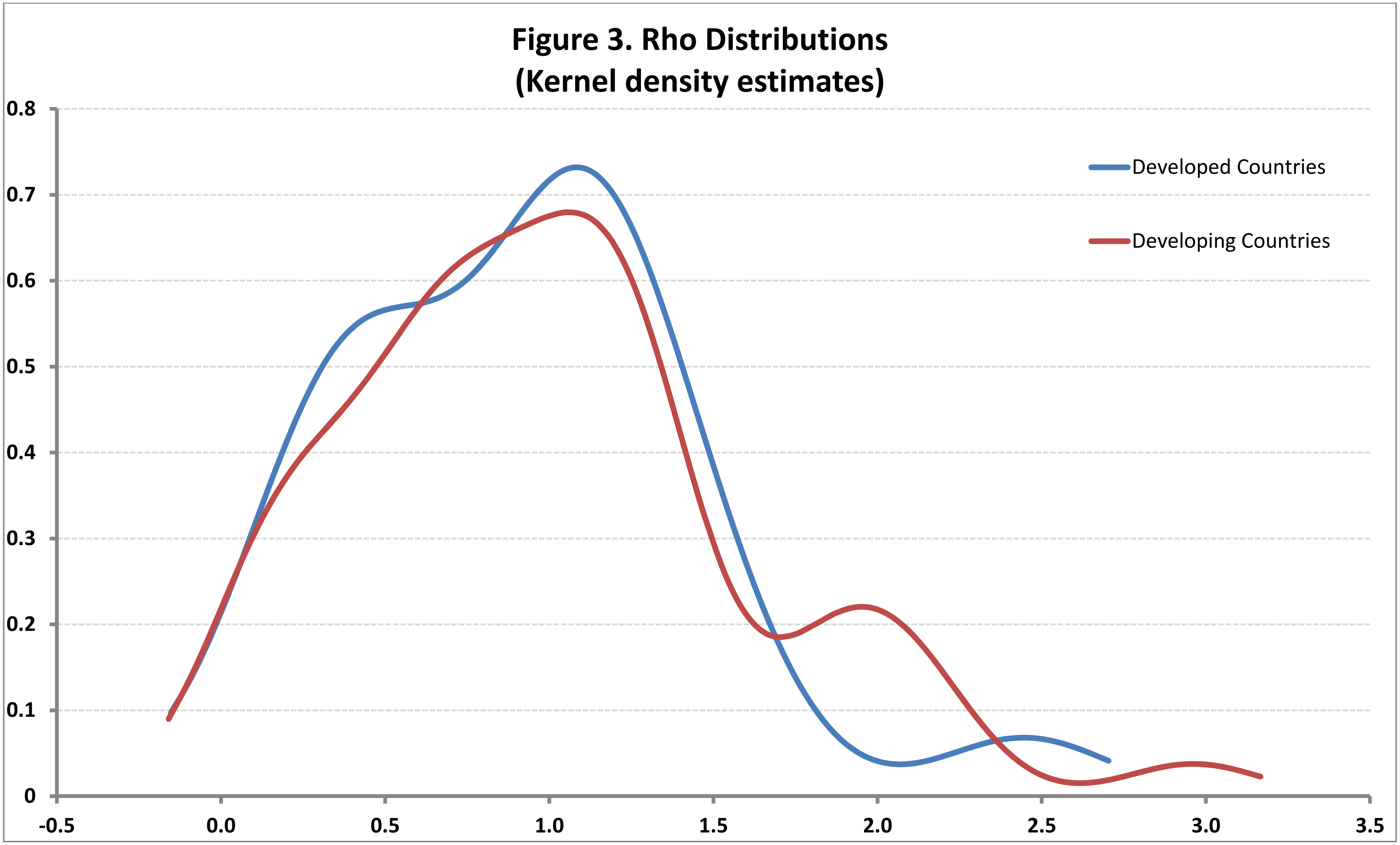


Figure 3. Rho Distributions
(Kernel density estimates)
Developed Countries
Developing Countries
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-0.5
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5