"When in Rome":
Identifying social norms using coordination games

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SUPPLEMENTAL ANALYSIS

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In this supplement, we offer a few alternative tests of our hypotheses in the paper *When In Rome*. Specifically, we conduct OLS regressions with subject-level fixed effects estimating the effect of the matching task on an actions' ratings. We use fixed effects because we are using all the participant's responses and, as such, wish to control for each subject's characteristics that might systematically influence their guesses across actions or vignettes. We assume the heterogeneity is "fixed" for each subject and we remove this source of variation from the data by subtracting each subject's means from each of their observations prior to estimating the model. The following is the regression equation estimated:

$$Rating_{it} = \beta_0 + \beta_1 UniversityMatch_{it} + \alpha_i + u_{it} \qquad (1)$$

Let *i* denote a subject's observation and *t* denote the stages such that *t*=1 is the personal belief stage and *t*=2 is the university-matching stage. The dependent variable is the appropriateness rating provided, ranging from values of -1 to +1.[5] The variable $UniversityMatch_{it}$ is an indicator variable that is equal to 1 when the observation was elicited during the university student matching treatment, or when *t*=2, and is equal to zero otherwise. In this specification, the treatment effect of matching with a university-subject is identified by the coefficient β_1. The variable α_i is unobservable time-invariant (and thus the lack of the t subscript) individual effect and the variable u_{it} is the error term. When we center each variable by their mean (within each subject over the three stages of responses for each vignette, see table 1), we arrive at the following fixed-effects regression equation:

$$Rating_{it} - \overline{Rating_i} = \beta_0 + \beta_1 (UniversityMatch_{it} - \overline{UniversityMatch_i}) + (\alpha_i - \overline{\alpha_i}) + (u_{it} - \overline{u_i}) \qquad (2)$$

[5] We convert subjects' appropriateness responses into numerical scores to compute average ratings for an action. A rating of "very socially inappropriate" received a score of -1, "somewhat socially inappropriate" a score of -1/3, "somewhat socially appropriate" a score of 1/3, and "very socially appropriate" a score of 1.

Since α_i is constant within each subject, it follows that $\alpha_i = \overline{\alpha_i}$ and thus drops out of the regression equation. Thus, the fixed-effects estimation strategy eliminates individual-differences which are constant across the personal belief and the university-matching stages. The regression equation can be simplified as the following:

$$\ddot{Rating_{it}} = \beta_0 + \beta_1 \ddot{UniversityMatch_{it}} + \ddot{u_{it}} \qquad (3)$$

We run this regression equation separately by U.S. born subjects and non-U.S. born subjects and report the estimated coefficients in Table S1 and Table S2 below. [6]

DV: Appropriateness Ratings	Tipping Scenario	
	Born in U.S.	Non-U.S. Born
University Match	0.10**	- 0.04
	[0.02]	[0.04]
Constant	-0.13**	0.04 †
	[0.01]	[0.02]
Observations	1,526	644
R-squared	0.004	0.001
Fixed Effects	Yes	Yes

Table S1: Fixed Effects Regression Results in the Tipping Scenario. Estimated fixed-effects coefficients from estimating equation (3) are reported with robust standard errors in square brackets. Only observations from the tipping vignette and from the personal belief and university-matching treatment are used. Omitted category (constant) is personal opinion ratings. Errors are clustered at the subject level. † significant 0.10%; * significant 5%; ** significant 1%.

In Tables S1 and S2, column 1 reports ratings from subjects born in the U.S. and column 2 reports ratings from subjects who were not born in the U.S. (foreign-born). The coefficient on the variable "University Match" test hypothesis 1. For the tipping scenario, we see that for U.S.-born subjects appropriateness ratings elicited when there is a matching task and the target is another university subject (β_1=0.10, p=0.000, Table S1 column 1) are significantly different from ratings elicited without the matching task (the omitted category). One reason why the regressions show significant

[6] We run a separate fixed effects regression for U.S. and non-U.S. born subjects as controlling for country of birth by an inclusion of an indicator variable would lead to multi-collinearity as a country-born indicator variable would not vary over the unobserved individual fixed effect.

differences while the t-tests above did not may because we are able to control for within-subject variation. However, for foreign-born subjects there is no significant difference between ratings elicited when the match target was another university subject and personal ratings (β_1=-0.04, p=0.265, Table S1 column 2). For the punctuality scenario, there are insignificant differences between U.S. born subject's ratings with and without the university-matching task (β_1=0.02, p=0.272, Table S2 column 1). Similarly, non-U.S. born subjects' rating when matching with another university subject do not significantly differ from personal beliefs (β_1=-0.05, p=0.05, Table S2 column 2).

DV: Appropriateness Ratings	Punctuality Scenario	
	Born in U.S.	Non-U.S. Born
University Match	0.02	-0.05 †
	[0.02]	[0.03]
Constant	-0.04**	0.07**
	[0.01]	[0.01]
Observations	1,526	644
R-squared	0.00	0.00
Fixed Effects	Yes	Yes

Table S2: Fixed Effects Regression Results in the Punctuality Scenario. Estimated fixed-effects coefficients from estimating equation (3) are reported with robust standard errors in square brackets. Only observations from the punctuality vignette and from the personal belief and university-matching treatment are used. Omitted category (constant) is personal opinion ratings. Errors are clustered at the subject level. † significant 0.10%; * significant 5%; ** significant 1%

Taken together, we find some support for hypothesis 1. Foreign-born subjects report different appropriateness ratings under the matching-tasks in comparison to reporting personal beliefs for tipping and directionally different responses (though not significant) for punctuality. When we run fixed effects OLS, we are able to use more data and control for systematic individual heterogeneity in responses, we find partial support for hypothesis one.

We also test hypotheses two and three using a fixed-effects multiple regression analysis with the rating of the action as the dependent variable (which ranges from -1 to +1). For this analysis, we include only observations elicited during a matching task, as we seek to only analyze the treatment effect of varying a subject's reference group for the coordination game and not the effectiveness of the matching task in comparison to personal beliefs. The estimated equation is:

$$\ddot{Rating}_{it} = \beta_0 + \beta_1 \ddot{SameCountryMatch}_{it} + \beta_2 (\ddot{SameCountryMatch}_{it} \times ForeignBorn_i) + \ddot{u}_{it} \qquad (4)$$

The variable $SameCountryMatch_{it}$ is an indicator variable that is equal to 1 when the observation was elicited during the same-country match treatment, or when *t*=3, and is equal to zero otherwise. The variable $ForeignBorn_i$ is an indicator variable that is equal to 1 if subject *i* was foreign born and is equal to zero otherwise.

DV: Appropriateness Rating	Tipping Scenario
Same-Country Match	-0.00
	[0.02]
Foreign Born x Same-Country Match	0.20**
	[0.06]
Constant	-0.02*
	[0.03]
Observations	2,170
R-squared	0.01
Fixed Effects	Yes

Table S3: Fixed Effects Regression Results with Foreign Interaction in the Tipping Scenario. The table reports the estimated fixed-effects coefficients from estimating equation (4). The coefficients are reported with robust standard errors in square brackets. Only observations from the university-subject matching treatment and same-county born matching treatment under the tipping vignette are used. Omitted category (constant) is university-subject matching ratings. Errors are clustered at the subject level. † significant 0.10%; * significant 5%; ** significant 1%.

In this specification, the treatment effect of matching with a same-country born subject is identified by the coefficient β_1. For those who are foreign-born, the treatment effect of matching with a same-country born subject is identified by β_1+β_2. Therefore, the estimated coefficient β_2 captures the variation in appropriateness ratings between U.S.-born subjects and foreign-born subjects under the same-country born matching treatment. Notice that equation 4 is a fixed effects specification in that variables are on their means, including the interaction variable.[7] Table S3 reports the estimated coefficients of this regression where the dependent variable is the rating given in the matching task in the tipping scenario. To test hypothesis 2, we examine whether foreign-born subjects matching with foreign-born subjects (i.e. the linear combination of the coefficients of (*Same-Country Match + Foreign Born x Same-County Match*) are significantly different than U.S.-born subjects matching with U.S.-born subjects (i.e. the coefficient of *Same-Country Match*).

We find that for the tipping vignette, the ratings of foreign born nationals coordinating with foreign born nationals significantly differs from the ratings of U.S. born nationals coordinating with U.S. born nationals ($F(2,154)=7.11$, $p=0.001$). The positive sign on the coefficient for *Foreign Born x Same-County Match* is predicted by the ex-ante identified norms and this is evidence that supports hypothesis 3. That is, for those born in countries where it is customary to tip less than in the U.S., all tipping actions are rated significantly more appropriate by foreign born nationals coordinating with foreign born nationals.[8]

We run the same exercise for punctuality. To control for individual heterogeneity, we run a fixed-effects regression separately for foreign-born subjects from countries that have a norm to arrive 'on time' and for foreign-born nationals that have a norm to arrive 'late' (Panel B of Table 1 reports the ex-ante identified coding for these countries). The regression equation is identical to the fixed effects specification in equation 4, but now is applied to the punctuality vignette observations. These estimated coefficients of the regression are provided in Table S4. We test whether foreign-born subjects matching with foreign-born subjects (i.e. the linear combination of the coefficients of (*Same-Country Match + Foreign Born x Same-County Match*) are significantly

[7] As an alternative specification, we ran an OLS specification which allows us to include a `foreign born' indicator variable. The results are quantitatively the same and are available from the authors by request.
[8] Note that is approach bundles observations of subjects born in Canada or the Cayman Islands, whose ex-ante tipping norm is identical to the U.S. The inclusion of these observations therefore downward bias our results.

different than U.S.-born subjects matching with U.S.-born subjects (i.e. the coefficient of *Same-Country Match)*. In the regression reported in column 1 of table S4 we find support (F(2,134), p=0.037) and in the regression reported in column 2 of Table S4 (F(2,128)=8.25, p=0.000).

DV: Appropriateness Rating	Punctuality Scenario	
	'On Time' Countries & U.S.	'Late Countries' & U.S.
Same-Country Match	0.00	0.01
	[0.01]	[0.01]
Foreign Born x Same-Country Match	-0.06*	0.14**
	[0.03]	[0.04]
Constant	-0.00	-0.02*
	[0.00]	[0.01]
Observations	1,890	1,806
R-squared	0.000	0.003
Fixed Effects	Yes	Yes

Table S4: Fixed Effects Regression Results with Foreign Interaction – Punctuality Scenario. Note: Estimated fixed-effects coefficients from estimating equation (4) are reported with robust standard errors in square brackets. Only observations from the university-subject matching treatment and same-county born matching treatment under the punctuality vignette are used. Column 1 conditions on observations from those born in the U.S. or born from countries whose ex-ante norm is to arrive \`on-time'. Column 2 conditions on observations from those born in the U.S. or born from a country whose ex-ante norm is to arrive \`late'. Omitted category (constant) is university-subject matching ratings. Errors are clustered at the subject level. † significant 0.10%; * significant 5%; ** significant 1%.

These results are consistent with hypothesis 2. Consistent with hypothesis 3, we find that the sign on the coefficient *Foreign Born x Same-County Match* is in the direction predicted by the ex-ante identified norms (negative in column 1 and positive in column 2). Note that the estimated coefficient pools across all actions. The average of all the punctuality actions is to arrive 7.14 minutes late. In countries where the ex-ante norm is to arrive 'on time', the average arrival time of being 7.14 minutes late less acceptable when subjects are coordinating with other university subjects (β_2=-0.06, p=0.018, Table S4 column 1). In countries where the ex-ante norm is to arrive 'late', the average arrival time of being 7.14 minutes late id rated more acceptable when subjects are coordinating with other university subjects (β_2=0.14, p=0.001, Table S4 column 3).