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MACRO-LEVEL INSTITUTIONS AND MICRO-LEVEL ECONOMIC BEHAVIOR:
A META-META ANALYSIS OF 1,126 STUDIES

Jason A. Aimone
Sheryl Ball
Esha Dwibedi
Jeremy J. Jackson
James E. West

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Macro-Level Institutions and Micro-Level Economic Behavior: A Meta-Meta Analysis of
1,126 Studies

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ABSTRACT

We combine societal-level institutional measures from 51 countries between 1996 and 2017 with individual decision-making outcome data from 1,126 laboratory experiments in six meta-analyses to evaluate the effects of within-country institutional change on pro-social and Nash behavior. We find that government effectiveness and regulatory freedom positively correlate with pro-social behavior. We find that freedom from each of the following components of regulation; interest rate controls, binding minimum wages, worker dismissal protections, conscription, and administrative requirements; are correlated with prosocial behavior and are inversely correlated with Nash behavior. These results suggest the importance of considering spillover effects in pro-social behavior when designing government policy.

Jason A. Aimone
Baylor University
Department of Economics
One Bear Place #98003
Waco, TX 76798
jason_aimone@baylor.edu

Sheryl Ball
Virginia Tech
sball@vt.edu

Esha Dwibedi
University of Virginia
edwibedi@gmail.com

Jeremy J. Jackson
Fayetteville State
jjackson52@uncfsu.edu

James E. West
Department of Economics
Baylor University
One Bear Place #98003
Waco, TX 76798
and NBER
j_west@baylor.edu

1 Introduction

A growing number of studies examine the relationships between culture, institutions and economic outcomes. As defined by Guiso, Sapienza and Zingales (2006), culture is “those customary beliefs and values that ethnic, religious, and social groups transmit fairly unchanged from generation to generation.” Recent studies include the effects of culture on national savings (Guiso, Sapienza and Zingales, 2003; Knowles and Postlewaite, 2004), preferences for redistribution (Luttmer and Singhal, 2011; Guiso et al., 2003), differences in bargaining behavior (Roth, Prasnikar, Okuno-Fujiwara and Zamir, 1991), and differences in ultimatum game play by tribe (Henrich, Heine and Norenzayan, 2010).

The relatively static nature of culture limits the resulting outcomes caused by culture that can be empirically identified, particularly at the individual level. Institutions, by contrast, can and do change. North (1991) defines institutions as “the humanly devised constraints that structure political, economic, and social interaction. They consist of both informal constraints (sanctions, taboos, customs, traditions, and codes of conduct), and formal rules (constitutions, laws, property rights).” (p.97) While recent work examines how macro-level institutions affect growth and income (Kremer, Willis and You, 2022), it remains an open question whether and how macro-level institutions are related to the underlying social and decision-making behaviors of people living under those institutions. Examining the effects of macro-level institutions on individual behavior is empirically challenging. Survey measures of behaviors and preferences generally lack salience, leading to questions regarding validity. Societal-level institutions typically cannot be varied within an individual study, whether a field experiment, a laboratory experiment, or observational data, limiting the ability to identify the effects of macro-institutions on individual behavior.

To identify the effects of macro-institutions on individual behavior, we combine data from individual experimental studies used in six previous meta-analyses but do not perform a

conventional meta-analysis.¹ Due to the large number of studies, we obtain sufficient within-country variation to estimate the effects of country-level institutional factors omitted from the original analyses while controlling for time-invariant social and environmental factors (culture, geography, etc.). We benefit from the tight control of micro-institutions inherent in economic experiments. More specifically, we combine institutional data from Kremer et al. (2022) and the 2021 Fraser Economic Freedom of the World Index (The Fraser Economic Freedom of the World Index, 2021) with data from 1,126 experiments that span 22 years and 51 countries. We find empirical evidence that macro-level institutions do matter. Macro-level institutions that facilitate economic growth and trade (such as regulatory quality and economic freedom) are positively correlated with micro-level measurements of prosociality. Other institutions, such as a better-funded military, are inversely correlated with prosociality, while more regulatory freedom is associated with a decreased propensity for Nash behavior.

In the remainder of the paper, we connect the literature on institutions to individual behavior, explain the construction of our data set, describe our analysis, and both present and discuss our results on the influence of macro-level institutions on micro-level behavior.

2 Institutions and Individual Behavior

The importance of institutions appears in the earliest scholarly work of economists. The *Wealth of Nations* (Smith, 1776) considers the role of macro-level institutions by which economies either flourish or flounder. The *Theory of Moral Sentiments* (Smith, 1759) addresses the role of micro-level institutions on individual and group behavior. Institutions

¹Our methods differ from previous meta-analyses, which combine data from existing studies to estimate population-level grand mean treatment effects. Examples include Engel’s (2011) study of 129 experimental papers using the dictator game. Lin, Brown, Imai, Wang, Wang and Camerer (2020) performs a meta-analysis of 2,000 classroom experiments conducted on Moblab to explore behavior in double auctions and ultimatum games. Jackson and Mackevicius (2024) estimate the grand mean treatment effect of increased school spending.

themselves may be affected by preferences, as described by the Tiebout Hypotheses² or Ostrom’s (2009) work on collective action agreements to solve common-pool resource problems. However, preferences are not universally viewed as exogenous and may themselves be affected by institutions (Fehr and Hoff, 2011).

Substantial research links societal differences to preferences and behaviors. As the Soviet Union dissolved, there were concerns about whether Soviet citizens would have difficulty adjusting to capitalism, (Ball, 1993) despite the lack of experimental evidence that market behavior of individuals differed between countries (Roth et al., 1991). Other country-level research uses the Global Preferences Survey, which has been validated against incentivized economics tasks, to explore cross-country variation in economic preferences (Falk, Becker, Dohmen, Enke, Huffman and Sunde, 2018). This work finds that preferences vary with age, gender, and cognitive ability, and it documents substantial heterogeneity in preferences such as risk preferences, altruism, and reciprocity measured between countries. Time preferences are associated with Protestantism (Guiso et al., 2006; Gorodnichenko and Roland, 2011) and other measures of individualism. In other work, striking differences in bargaining behavior were documented in fifteen small societies (Henrich, Boyd, Bowles, Camerer, Fehr, Gintis and McElreath, 2001). Here, both the degree of integration with world markets and the level of cooperation required for the society’s primary economic production were associated with variations in the level of cooperativeness.

Both the development literature and growth literature have established formal and informal macro-level institutions’ role in macro-level outcomes. Sound institutions and property rights promote growth and development, while bad institutions hinder it.³ Recent macroeconomic studies continue to explore the importance of institutions in the growth and con-

²Tiebout (1956) hypothesized that with costless mobility, people migrate to localities with their preferred levels of public goods and taxation. In the long run, variations in social institutions (local public goods and taxation) are caused by preferences.

³See Easton and Walker (1997), Knack and Keefer (1997), Gwartney, Lawson and Holcombe (1999), Acemoglu, Johnson and Robinson (2001), Acemoglu, Johnson and Robinson (2005), Doucouliagos and Ulubaşoglu (2008), and Keefer and Knack (2008).

vergence between wealthy and poor countries and whether such institutions converge over time between countries (Kremer et al., 2022).

Institutions are a creation of human behavior and decision-making which evolve as a means for humans to overcome the problems of collective action (Olson, 1965) and in situations where cooperation between individuals is desirable but challenging due to incentive incompatibility (Ostrom, 1990; Calvert, 1995). Constitutions and the rules that they establish for political systems are devised by humans in the process of deliberation (Brennan and Buchanan, 1985). Good institutions require feedback. For institutions to survive over time, the institutions must have self-reinforcement mechanisms that create behaviors and decisions which solidify and encourage the institution (Aoki, 2001; North, 2010; Binmore, 2010). Durable institutions both influence and are influenced by individual behavior. Game theory has been used to describe institutions as self-reinforcing behavior to cooperate or coordinate in repeated games (Calvert, 1995). Studies evaluating institutions' effect on behavior must address an endogeneity problem exacerbated by the use of aggregate rather than individual data on behavior.

A separate line of research explores whether institutions that affect women's socialization also affect their willingness to compete for incentives versus preferring piece-rate pay. For example, the behavior of teenagers in a patriarchal small society, where only men are landowners and determine household monetary decisions, is compared to those from a matrilineal small society, where men join the woman's family after marriage and have no authority or property (Andersen, Ertac, Gneezy, List and Maximiano, 2013). Men behave more competitively in the patriarchal society, but women are equally competitive in the matrilineal society. Our work differs from these examples in that we look at national institutions instead of institutions created by smaller groups of individuals.

Coleman (1994) provides a theoretical synthesis of the individual rational choice approach of economics and a focus on the collective inherent in sociology. He posits that the primary

questions of social science are about the functioning of social systems, e.g., institutions. He describes a world where institutions influence individual behavior, collectively influencing the social system of behavior. This theory has been referred to in the literature as a macro-micro-macro chain that describes the dynamism of institutional change (Gërxhani and Van Breemen, 2019). While Coleman’s (1994) focus is on the system, he cedes that most social science focuses on the individual. Indeed,

“A major problem of data adequacy exists in confirmation of theories based on system-level data when the systems are large in size and few in number. There are too many alternative hypotheses which the data cannot reject. In part for this reason, research data in the social sciences are often gathered at the level of units below the level of the system whose behavior is of interest” (Coleman, 1994, p3).

Consistent with Coleman’s observation, our data is gathered at a level below our level of interest, macro-institutions. However, the volume of data available enables us to address Coleman’s data adequacy concerns and examine system-level hypotheses using country-level fixed effects.

Economic freedom is the ability to make economic choices freely within the rule of law. It is broadly considered a measure of the degree of market exposure in a society (Berggren, 2003), which subsequently affects individual fairness behavior (Cochard, Le Gallo, Georgantzis and Tisserand, 2021). Experimental work on market interactions shows that irrespective of whether the experience is positive or negative, market interactions increase trust and reciprocity (Aghion, Algan, Cahuc and Shleifer, 2010; Choi and Storr, 2020; Calcagno and Jackson, 2023). Storr and Choi (2019) investigate the potential relationship between markets and morally corrupt behavior. They argue that those living in market societies are less corrupt and materialistic and are more trusting and accepting of others than those living in non-market societies,. Economic freedom is positively associated with charitable giving (Cai, Caskey, Cowen, Murtazashvili, Murtazashvili and Salahodjaev, 2022; Jackson

and Beaulier, 2023; Choi and Storr, 2020) and negatively associated with materialistic values (Teague, Storr and Fike, 2020). Based on these findings, we hypothesize that economic freedom will be positively correlated with pro-social behavior and inversely correlated with Nash behavior. While trust, a component of social capital, is known to have many societal benefits;⁴, trust itself is known to be a strong predictor of pro-social behaviors such as cooperation and collectivism (Irwin, 2009; De Cremer and Stouten, 2003). Observational studies find a positive association between economic freedom and trust (Berggren and Jordahl, 2006; Callais, Harris and Borchard, 2022) and a negative relationship between regulation and trust. A larger number of rules, or greater regulation, reduces trust and reciprocity (Rietz, Schniter, Sheremeta and Shields, 2018).

An emerging literature suggests that state capacity⁵ is positively associated with trust (Andriani and Sabatini, 2015) and social capital (Jensen and Ramey, 2020), suggesting a positive association with pro-social behavior. As state capacity expands, so too does social trust in institutions (Andriani and Sabatini, 2015). In this capacity, an increase in state capacity can be interpreted as pro-social behavior (Irwin, 2009).

Conventional laboratory studies are well-suited to exploring exogenous changes in micro-institutions, such as the composition of players, relationships between individual players, available information, and the set of possible decisions. Macro-level institutions are outside the scope of parameters that can be changed within an experimental design. Despite these limitations, studies with constructed institutions have produced valuable insights. Formal rules can influence the establishment and reinforcement of norms of reciprocity and Smithian morality (Smith and Wilson, 2019). Likewise, rules and regulations affect the development of norms of trust (Rietz et al., 2018). Wide-scale surveys such as the General Social Survey

⁴Social capital and trust are positively correlated with economic growth (Knack and Keefer, 1997), democracy (Inglehart, 1999), happiness (Bjørnskov, 2003), and health (Kawachi, Subramanian and Kim, 2008).

⁵Besley and Persson (2011)[6] defines state capacity as “the institutional capability of the state to carry out various policies that deliver benefits and services to households and firms.” See also Acemoglu, García-Jimeno and Robinson (2015) for more detail.

(GSS) allow researchers to explore varying cultures and macro-institutions and their relationship to trust. However, questions in these surveys do not provide the same salience and control of micro-institutions as laboratory experiments. In the study most closely related to our work, Cochard et al. (2021) illustrates the importance of macro-level institutions to micro-level behavior in their meta-analysis of ultimatum and dictator games and the correlation between fairness and market exposure/economic development, which they treat as a static macro-level institutional characteristic.⁶

3 Data and Methodology

3.1 Behavioral Data from Meta-Analyses

We merge data from six published meta-analyses representing six experimental economics paradigms: dictator games, ultimatum games, prisoner’s dilemma games, trust games, public goods games, oligopoly games, and lying behavior (see Table 1). These meta-analyses were created based on their authors’ research interests and data availability. In addition to published studies, these meta-analyses include conference papers, pre-publication studies, and unpublished replications to minimize bias that could arise from including only published studies with significant findings (Rosenthal, 1976) for a total of 1,126 different experimental studies/treatments.

Three coders independently reviewed each individual study and transcribed relevant variables for our use.⁷ The coders were provided a common coding procedure (see these instruc-

⁶Cochard et al. (2021) is primarily interested in the “market exposure” outcome of macro-institutions, which they proxy with GDP, a Human Development Indicator, poverty rate, bank account penetration, and ease of doing business index. As such, their study focuses upon the important question about how *static* macro-economic outcomes and general characteristics can relate to microeconomic behavior but does not examine our question of interest: how *changing* macro-level *institutions* within a country affect microeconomic behavior.

⁷Two of the coders were undergraduate students with experience reading experimental economic journal articles and writing theses in experimental economics. The third coder was a Ph.D. student in experimental economics. All coders were paid a flat rate for their work over the summer. The final coder, Esha Dwibedi, was not designated a co-author during coding but became a full coauthor after coding was completed.

tions in Appendix A.1), a spreadsheet template for data entry, and a specific randomized order in which papers were to be processed. Coders were instructed to find within each paper specific variables of interest including treatment effects, which varied by meta-analysis. These include the city, state, country, and year of data collection/publication of each study.⁸ If data was collected at multiple sites/universities, coders were to record each location. Any irregularities were marked for follow-up. Individual studies for which we were unable to clearly identify either the location or year in which the experiments took place were omitted from our final data set.⁹

We combined the data entries from each independent coder for all variables of interest. If disagreement existed between one coder and the remaining two, the majority entry was used. In case of discrepancies among all three, the variable of interest was re-inspected and re-coded from the relevant paper by the graduate student coder. This process ensured the minimization of human error in the coding process.¹⁰ We merged the experimental data by year and country with the macro institutional data described in the following subsection.

Within each meta-study, we characterized the extent to which the dependent variable represents pro-social behavior or Nash behavior. We define pro-social behavior as displays of altruism or the maximization of joint well-being. We use the conventional definition of Nash behavior as choosing a self-interested best response to the other players' choices. Nash and pro-social behavior are the inverse of each other in the individual studies on dictator

⁸Coders were asked to record the year of data collection reported in each paper. If the year was not reported, the coding instructions specified, "If the exact year of data collection is not provided, look at the title page and see if the title page notes a date the paper was 'received' by the journal. Keep this year in mind. Next, please do a Google Scholar search of the paper. Underneath the brief abstract of the paper that appears in Google Scholar, you will see links 'Cited by,' 'related articles,' and 'All X versions'. Click on the 'All X versions' link. Find the smallest year version (earliest date). Use that date as the year data was collected."

⁹We failed to obtain relevant data on location (at any of the city, state, or country levels) for 174 treatments. We also failed to determine the year of collection/publication for 143 treatments/observations.

¹⁰For data on the location of the study, there are discrepancies in data coded between all three coders for 41 treatments. Discrepancies exist between two coders for 59 treatments. For the year of collection/publication, there are disagreements between data coded by two coders for 843 treatments, while discrepancies between all three coders exist for 95 treatments.

game, prisoner’s dilemma, VCM, and trust game paradigms. In the lying, ultimatum, and oligopoly paradigms, a unique unambiguous “pro-social” behavior does not exist, and we report only Nash behavior. We replicated each individual meta-study and computed residuals standardized at the meta-study level. We standardized to ensure comparable magnitudes of residuals across component meta-analyses. The standardized regression residuals represent unexplained variation in each study’s experimental outcomes. We present summary statistics for the studies in which Nash Residuals are defined in Table 2 and Pro-Social Residuals are defined in Table A.1.

3.2 Macro-Institutional Data

We use a variety of annual country-level measurements of institutional characteristics available from The World Bank¹¹ and the Fraser Institute. From the World Development Indicators (The World Bank, 2021a), we use measurements of Taxes on Goods and Services (as a percent of revenue) and Military Expenditures (as a percent of GDP). From the Worldwide Governance Indicators (The World Bank, 2021b) we use measurements of Political Stability, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption. The Fraser Economic Freedom of the World Index (2021)¹² publishes an annual overall measurement of economic freedom, which is a weighted average of scores in five areas: the Size of Government, Legal System and Security of Property Rights, Sound Money, Freedom to Trade Internationally, and Regulation. For clarity, we will subsequently refer to EFI Regulation as Regulatory Freedom. We estimate specifications using either the five areas of the EFI or the composite total EFI but not both due to total EFI being a linear combination of the five areas. The primary specifications of our analysis with economic freedom as an

¹¹See Kremer et al. (2022) for a study of the effects of institutions on macroeconomic convergence. We include in our study the subset of variables used by Kremer et al. (2022), which measure institutional characteristics as opposed to outcomes and which contain annual variation.

¹²The Heritage Foundation publishes a somewhat similar index of economic freedom. Heritage data is available from 1995 while Fraser data is available from 1970. Areas and categories also differ between the two indices.

explanatory variable are estimated using the Economic Freedom of the World Panel Dataset.

The Worldwide Governance Indicators (The World Bank, 2021b) have increasingly been used in academic research and as policy levers, (Erkkilä, 2020) but with some criticism (Thomas, 2010; Langbein and Knack, 2010). Good governance, as measured by WGI, increases formal entrepreneurship while decreasing informal entrepreneurship in emerging economies (Omri, 2020). Governance is correlated with economic growth (Acemoglu et al., 2005; Han, Khan and Zhuang, 2014; Huynh and Jacho-Chávez, 2009; Kremer et al., 2022) and mitigates the effect of wealth inequality on growth. The WGI measure of political stability is itself positively associated with the EFW’s measure of the rule of law (Holcombe and Rodet, 2012). A similar indicator, the European Quality of Government Index, has been used to demonstrate that good governance positively influences trust (Lombardo and Ricotta, 2022). The WGI are commonly used as measures of state capacity (Savoia and Sen, 2015).

The military expenditure and taxes on goods and services measures from the World Bank’s World Development Indicators (WDI) are both measures of national fiscal policy. Military expenditures (Compton and Paterson, 2016) and taxes on goods and services (Abd Hakim, Karia and Bujang, 2016) are negatively associated with economic growth. However, little current literature explores the relationship between these variables and social trust or pro-social behavior. In addition, social trust was the most significant predictor of government expenditure and revenue (Bergh and Bjørnskov, 2011). Due to the documented positive association between economic growth and trust (Bjørnskov, 2012; Knack and Keefer, 1997), we hypothesize a negative relationship between military expenditure and taxes on goods and services on Pro-Social behavior.

We standardize each institutional index over all countries and years of analysis. The extent to which reported means differ from zero and standard deviations differ from 1 indicates the extent to which the countries included in our analysis differ from the set of all nations

in all years. In Table 2, Column 1, the full sample for which Nash Residuals are defined, the mean of taxes on goods and services as a percentage of revenue is 2.399. We view this as evidence that the countries included in our analysis are more dependent upon taxes on goods and services as a source of government revenue relative to the average dependence of all nations. Relative to the rest of the world, the countries included in our analysis are most representative in the areas of political stability and absence of violence/terrorism, and size of government. Our countries are least representative regarding taxes on goods and services, government effectiveness, regulatory quality, rule of law, control of corruption, and property rights.¹³ In each attribute, the countries included in our analysis exceed average world attributes by more than one standard deviation. Turning to Pro-Social Residuals in Table A.1, we observe similar patterns regarding the degree to which the institutions of the countries we study are representative of all countries as found with Nash Residuals.

Pro-Social and Nash Residuals represent variation in individual-level behavior that is unexplained in the original published works. Our study will examine whether some unexplained variation can be explained by macro-level institutional factors omitted from the original published works. As an analysis of standardized residuals assembled from many studies, we recognize the potential of extreme outliers or leverage points to cause spurious results. Column 2 presents a subsample in which Pro-Social Residuals less than -3 or greater than 3 are omitted. Ten observations are omitted from Column 1 to obtain the subsample presented in Column 2. Likewise, fourteen observations are omitted from Column 4 to obtain the sample of Nash Residuals in Column 5. We note a modest effect on the means and standard deviations of all institutional measurements relative to Column 1, but more substantial effects on the standard deviations for both Nash and Pro-Social Residuals in

¹³These differences in our sample relative to the sample of all countries could be attributed to scientific research being disproportionately generated in “Western, educated, industrialized, rich, and democratic” countries. Henrich et al. (2010) refers to this as the “WEIRD” phenomena. Although most of our experimental studies occur in “WEIRD” countries, our fixed-effects methods statistically control for all time-invariant characteristics, ameliorating “WIERD” effects.

Tables 2 and A.1 respectively.

In Table 2 Columns 4 and 5, we present summary statistics on the subset of countries for which there are ten or more experimental observations of Nash Residuals. Countries with ten or more experimental studies are somewhat less representative of all nations than the sample of all observations. Despite this, we use the sample described in Column 5, with extreme residual values removed, for the main specifications in our analysis to estimate our parameters of interest with greater precision. Table 3 contains the countries from which we observe ten or more experimental studies.¹⁴ Of the fourteen outliers removed to form our Nash residual final sample, we note that the United States had the largest number of outliers of any country at five, which is not surprising considering the large number of studies conducted within the United States. Likewise, with the Pro-Social Residuals, the largest number of outliers occurs within the United States, here at seven. We also note that in the Pro-Social Residual sample, studies from Columbia, Israel, and Tanzania are omitted due to fewer than ten observations.

Columns 3 and 6 present the Variance Inflation Factor (VIF) of each macro-institutional variable. We compute the VIF as $1/(1 - R_{aux}^2)$ where R_{aux}^2 is from an auxiliary regression of one macro-institutional variable on all other macro-institutional variables. We include country-level fixed effects so that R_{aux}^2 represents the proportion of within-country variation explained by variation in the remaining macro-institutional variables. Since EFI Total is a linear combination of its components, we exclude EFI Total from the auxiliary regressions of all other macro-institutional variables and compute the auxiliary regression for EFI Total using only WDI and WGI institutional variables. Multicollinearity is traditionally seen as high if $VIF > 10$. We observe high multicollinearity for all macro-institutional variables and extremely high multicollinearity for Rule of Law at 281.469. This indicates that almost all within-country variation in Rule of Law VIF is explained by variation in the remaining

¹⁴Countries for which fewer than ten experimental studies exist are enumerated in Table A.2.

macro-institutional variables (99.64%), which is consistent with our expectations, as social factors that cause the Rule of Law to increase plausibly also increase Control of Corruption and Governmental Effectiveness.

Our analysis in subsequent sections will find large and highly significant effects of Regulatory Freedom on both Pro-Social and Nash Residuals. To explore the mechanisms of these effects more carefully, we examine the individual components used to construct Regulatory Freedom. Summary statistics are in Table A.3. The Fraser Institute cautions that both the number of components and the composition of these components varies across countries over the full sample contained in the Economic Freedom of the World Panel Dataset. More specifically, data for a number of components do not exist before the year 2000. For this reason, the number of observations in Table A.3 is less than in Table 2. One component of Freedom from Business Regulation, Licensing Restrictions, is not available prior to 2004. Due to the large number of missing observations, we omit Licensing Restrictions from Table A.3 and from our analysis. We note that multicollinearity among components of Regulatory Freedom is much less than among higher level macro-institutional variables reported in Tables 2 and A.1 with 8 out of 14 VIFs less than the threshold of 10.

4 Methods and Results

4.1 Methods

Our data contains substantial variation both within each of the 51 included countries over time and between countries in each year. The fixed effects estimators we implement use institutional variation over time within an individual country to explain variation in Pro-Social or Nash behavior but do not attempt to explain variation across countries. We estimate

$$\left(\hat{\epsilon}_{ict} - \bar{\epsilon}_c\right) = \left(X_{ict} - \bar{X}_c\right) \beta + \nu_{ict} \quad (1)$$

where $\hat{\epsilon}_{ict}$ is the residual from study i conducted in country c in year t . X represents institutional characteristics contained within our data set, and ν is a stochastic disturbance term. We view each observation of our data set as an experimental repetition within an individual country. We cluster standard errors at the country level to correct for any possible heteroskedasticity.

We estimate Equation (1) for all individual explanatory variables in Table 2 and for sets of explanatory variables using Ordinary Least Squares. To correct for multiple testing bias in individual regressions, we report False Discovery Rate (FDR) q -statistics (Anderson, 2008; Benjamini, Krieger and Yekutieli, 2006). Identifying which macroeconomic institutions most affect individual behavior using multiple regression is complicated by the high degree of multicollinearity observed in Table 2, which will cause the standard errors of individual coefficients in a multivariate regression to be large.

4.2 Univariate Specifications

We begin with univariate regression of institutional variables on unexplained pro-social and Nash behavior in Tables 4, 5, and 6. Specifications with Pro-Social Residuals as the dependent variable are in Columns 1 and 2, and specifications with Nash Residuals as the dependent variable are in Columns 3 and 4. All specifications are estimated using the sample of all countries with outliers omitted. Coefficients from univariate regressions should be interpreted as the sum of direct and indirect correlations of the macro institution on unexplained Pro-Social or Nash behavior from the original studies. Performing individual regressions enables us to identify macro-level institutions with effects that would be obscured by multicollinearity in a multivariate regression. Tables 4, 5, and 6 contain estimated effects of individual institutional variables from the World Development Indicators, the Worldwide Governance Indicators, and the Fraser Institute Index of Economic Freedom respectively. We estimate the effects of each variable of interest on unexplained Pro-Social or Nash be-

havior (residuals) using data from the full sample of all countries in Columns 1 and 3, or data from countries in which there are ten or more observations in Columns 2 and 4. In all specifications, we drop outliers, include country-level fixed effects, cluster standard errors at the country level, and include False Discovery Rate q -statistics. All significance levels are based on FDR q -statistics, to address multiple testing hypothesis concerns.

In Table 4, we find negative and highly significant correlations between military spending as a percentage of GDP and Pro-Social Residuals (in both our full sample and in our sample with more than ten observations per country). In countries with ten or more observations (Column 2) a one standard deviation increase in military spending (as a percentage of GDP) is associated with a 0.221 standard deviation decrease in unexplained pro-social behavior. We do not find any significant correlations between military spending and Nash behavior, nor significant correlations between taxes and either pro-social or Nash behavior.

In Table 5, we find in both the sample with all countries and the sample with ten or more observations in each country that Government Effectiveness has a large, positive, and significant effect on pro-social behavior. In Column 2, a one standard deviation increase in Government Effectiveness is correlated with a 1.052 standard deviation increase in Pro-Social Residuals. In Column 1 we also find marginally significant effects of regulatory quality and control of corruption on unexplained pro-social behavior in the full sample of all countries. These effects lack statistical significance in the sample of countries with ten or more observations.¹⁵ In both Tables 4 and 5, we are unable to find any significant effects from either World Development Indicators or Worldwide Governance Indicators on Nash behavior.

Table 6 contains the only significant effect explaining Nash behavior - Regulatory Freedom. In the sample with ten or more observations per country (Column 4), a one standard deviation increase in regulatory freedom is associated with a 0.388 standard deviation decrease in Nash behavior. For the subset of games in which it is defined, pro-social behavior is

¹⁵See Table A.2 for the list of countries omitted due to less than ten observations.

the inverse of Nash behavior. In the analogous Column 2, a one standard deviation increase in regulatory freedom is associated with a 0.759 standard deviation increase in unexplained pro-social behavior. We observe similar highly significant correlations between Regulatory Freedom and Pro-Social and Nash Residuals when we use the full sample of countries. Additionally, we find a marginal positive correlation between government size and unexplained pro-social behavior. We observe a highly significant (at a 1% level) correlation between Pro-Social Residuals and the Total Fraser World Economic Freedom Index in both the sample of all countries and the sample of countries with ten or more observations. However, we find only a marginally significant (10% level) correlation between total economic freedom and Nash behavior in the sample with ten or more observations per country (Column 4). We cannot find a significant correlation in the full sample (Column 3).

4.3 Multivariate Specifications

We continue our analysis with a multivariate regression containing all macro-institutional variables examined individually in Tables 4, 5, and 6. A priori, the severe multicollinearity observed in Table 2 should reduce our ability to find statistically significant individual effects. Estimated multivariate coefficients are in Table 7. Columns 1 and 2 contain estimated effects on Pro-Social behavior and Columns 3 and 4 contain effects on Nash behavior. Columns 1 and 3 contain the effects of World Development Indicators, World Governance Indicators, and the aggregate Total Fraser World Economic Freedom Index. Columns 2 and 4 break the Fraser Index into economic freedom index components.

In Table 7 Column 1, among the set of World Development Indicators and Worldwide Governance Indicators, only the estimated coefficient of Government Effectiveness differs from zero, at a 5% level of significance. The coefficient of 1.314 indicates that a one standard deviation increase in Government Effectiveness is associated with a 1.314 standard deviation increase in unexplained pro-social behavior. The Total Economic Freedom Index variable

is marginally significant (10% level). The additional multicollinearity of disaggregating the Fraser World Economic Freedom Index into component variables in Column 2 slightly reduces the magnitude of Government Effectiveness, but remains significant at a 5% level. Among the areas of the economic freedom index, the effect of Regulatory Freedom is positive and highly significant (at a 1% level). We find that a one standard deviation increase in Regulatory Freedom is correlated with a 0.592 standard deviation increase in unexplained pro-social behavior.

The p -value of the F statistic in Column 3, 0.170, indicates a failure to reject the null hypothesis that all World Development Indicators, Worldwide Governance Indicators, and Total Economic Freedom jointly do not affect unexplained Nash residual behavior. However, including economic freedom index area variables leads to a model that does jointly have significant explanatory power upon unexplained Nash residual behavior. In Column 4, we find that a one standard deviation increase in Regulatory Freedom is associated with a 0.477 standard deviation decrease in unexplained Nash behavior at a 1% level of significance. Additionally, a one standard deviation increase in sound money is correlated with a 0.575 standard deviation increase in unexplained Nash behavior at a 5% level.

4.4 Components of Regulatory Freedom

Overall, the most compelling evidence of macro-institutional effects on unexplained pro-social and Nash behavior in both individual and multivariate specifications is the effect of Regulatory Freedom. We continue our analysis with a multivariate regression of Pro-Social and Nash Residuals on the components used by the Frasier Institute to construct their measurement of Regulatory Freedom. In Table 8, we report the estimated effects of 14 components of Regulatory Freedom, grouped as Freedom from Credit Market Regulation, Freedom from Labor Market Regulation, and Freedom from Business Regulation. Within Credit Market Controls, we find highly significant positive effects of Interest Rate Controls on Pro-Social

Residuals and negative effects on Nash Residuals. The Fraser Institute defines this variable as a measurement of whether “interest rates are determined primarily by the market, stable monetary policy, and reasonable real-deposit and lending-rate spreads” (The Fraser Institute, 2022). We find a negative effect of Private Sector Credit on Nash behavior in the full sample of all countries (Column 3) and a marginally significant negative effect for countries with ten or more observations (Column 4). The Fraser Institute defines Private Sector Credit as “the extent of government borrowing relative to private-sector borrowing.” We find that both Hiring Regulations and Minimum Wage have a positive and highly significant effect on unexplained pro-social behavior and a negative and significant effect on unexplained Nash behavior. Hiring Regulations and Minimum Wage has three components: “1) whether fixed-term contracts are prohibited for permanent tasks; 2) the maximum cumulative duration of fixed-term contracts; and 3) the ratio of the minimum wage for a trainee or first-time employee to the average value added per worker” (The Fraser Institute, 2022). We find a similar pattern of effects for Worker Dismissal, which the Fraser Institute defines as “the cost of the advance notice requirements, severance payments, and penalties due when dismissing a redundant worker with 10-years tenure.” We find a positive and highly significant effect of Conscription on Pro-Social Residuals, defined as “Data on the use and duration of military conscription.” Finally, we find highly significant positive effects of Administrative Requirements on unexplained pro-social behavior and highly significant negative effects on Nash behavior. The Fraser Institute defines Administrative Requirements as the cost of complying with administrative requirements (permits, regulations, reporting) issued by the government on a 1 to 7 scale where 1 is burdensome, and 7 is not burdensome.

4.5 Summary of Empirical Results

Overall, we find strong evidence that macro-institutions affect individual behavior. We find three macro-institutional variables with significant or highly significant effects on unexplained

pro-social behavior. These are Military Expenditure as a percent of GDP with a negative effect and Government Effectiveness and Total Economic Freedom with positive effects. We disaggregate EFI into its five areas and find that only Regulatory Freedom has a positive and highly significant effect on unexplained pro-social behavior. Of all the macro-level institutional variables, only Regulatory Freedom has a significant and robust effect on Nash behavior.

Table 5 suggests that three of the five Worldwide Governance Indicators of macro-institutions we explored are positively correlated with the degree to which individuals engage in pro-social behavior within those countries but not with the degree to which individuals engage in Nash behavior. In particular, we see marginally significant correlations to regulatory quality and control of corruption, and a highly significant positive correlation to government effectiveness. These results are consistent with the hypothesis that good governance (state capacity) would be positively correlated with pro-social behavior. Not only does good governance have the benefit of promoting economic growth, but it also fosters prosociality, helping individuals to thrive.

Increased military spending is correlated with significant decreases in pro-social behavior but not with changes in Nash behavior. Increased militarization is an externally focused institutional structure that negatively affects how individuals within a country relate to one another (e.g., decreased pro-social behavior.) The lack of an analogous significant positive coefficient on Nash behavior suggests that the decreased pro-social mentality is not due to an increased level of “selfish” consideration.

5 Discussion

Economists have long accepted that both formal and informal institutions have a profound impact on economic activity. The field now known as New Institutional Economics has proposed that “it is the institutions that govern the performance of an economy” (Coase,

1998). In this view, the vast material wealth realized from specialization and trade is made possible through exchange and transactions. More exchanges and more transactions can take place when transaction costs are reduced. Prosocial behavior and the corresponding social capital (Helliwell, Akin, Shiplett, Huang and Wang, 2018) facilitates increases in economic activity. We believe our work to be the first that empirically estimates the effects of societal institutions on individual-level behavior. Our estimated effects are consistent with the view that societal institutions do affect individual behavior and, importantly, pro-social behavior. Prosocial behavior is distinct from other individual behavior, such as consumption, because it relates to developing informal institutions, such as social capital, and norms that facilitate exchange (North, 1991). Our results are consistent with North’s (1991) theory of institutional evolution and feedback between institutions. Although our results should not be considered causal estimates, these results explore mechanisms linking economic freedom to social capital (Berggren and Jordahl, 2006) and pro-social behavior more broadly (Cai et al., 2022; Jackson and Beaulier, 2023; Storr and Choi, 2019).

The institutions of economic freedom have long been found to be those that promote economic growth and prosperity. However, this relationship is often explained by the commonly held belief that market-oriented societies are shrewder and more focused on economic efficiency and the drive for profit than the cooperative and prosocial orientation of more collectivist societies.¹⁶ Our results demonstrate that the institutions of economic freedom may shape individual behavior in a manner that increases society’s ability to overcome the problems of collective action (Olson, 1965) through pro-social cooperation, illustrating a possible mechanism by which economic freedom affects social well-being.

Institutional change rests at the heart of modern applied economic research in the fields of development, political economy, environmental, and others. Such studies typically utilize broad survey, governmental, or randomized control trial (RCT) data to explore the impact of

¹⁶There is evidence contrary to this belief, including Teague et al. (2020), which finds that economic freedom is associated with reduced materialism.

institutional change on economic decision-making. These methods largely complement each other as RCTs typically provide exogenous control with an intentionally narrow geographic and institutional scope (focused typically upon a specific institution in one or a few countries) while survey/governmental data lacks tight control but can provide a breadth of institutional and geographic scope. These studies offer intriguing and interesting results, but lingering questions remain. For example, Al-Ubaydli, List and Suskind (2017) address the “scalability” issue by which high-quality experimental studies may not scale within a country or be replicated in other countries due to factors related to statistical inference, publication bias, or representativeness of samples. The *Representativeness of the Situation* is a subtle but critical issue in scalability in which each new application of a policy utilizes different administrators than in the original experiments, potentially affecting the cost-benefit trade-offs within the experimental design. Additionally, every laboratory experiment, field experiment, or RCT is a snapshot view of microeconomic behavior subject to population micro and macro-level institutions. New applications and extensions of experimental findings across locations and time entail facing new administrators and changing (different) underlying macro and micro-level institutions that may substantially contribute to and be partially responsible for such scaling and replication problems.

Our work strengthens the case for increasing the frequency with which applied microeconomics studies of policy and institution change are reproduced in previously untested locations, especially those with different baseline institutional foundations. This type of replication is infrequent in economics; e.g., only 6.2 percent of development articles published in the top 10 general-interest economics journals from 2000 to 2015 had an attempted replication (either successful or unsuccessful) (Sukhtankar, 2017). To avoid the issues discussed above, pure replication (same design and same sample) is insufficient. Instead, we encourage repetition studies that extend studies to different baseline institutional environments within a country and to other countries to establish confidence that findings can be

generalized.

Finally, it should not be forgotten that institutional change can occur from the top-down (arising from a desire for change within the governing body) or bottom-up (through pushes for change by the people being governed.) The degree to which each of these forms of change occurs should differ between countries. Our fixed effects analysis is useful in removing country-specific time-invariant correlates of institutional change from our results. Our results indicate that the propensity to engage in pro-social decision-making is related to institutional structure, yet we make no claims as to the direction of structural causality. Our work provides strong evidence that there is an underlying mechanism that needs to be more fully explored both within micro-economics circles and macro-economics circles.

6 Conclusion

In this meta-meta-analysis, we compile data from over a thousand experimental studies across 51 countries, linking the behavioral data from those studies with their appropriate macroeconomic institutional context. Our results demonstrate that macro-level institutions do affect micro-level decisions. We find strong and significant relationships between macro-level institutional changes and micro-economic decision-making behavior, even after corrections for multiple comparisons. The use of experimental data to represent changing microeconomic decision-making provides for an unusually “clean” set of micro-level data in that experimental micro-level institutions that affect micro-level decisions are exogenously controlled and identified. In addition, we extend the literature linking preferences and institutions by considering macro-level institutions that are government-determined and enforced.

Our study uses an underutilized data source for macro-economic studies; Laboratory and field data from experiments. These data are primarily used in isolation within a singular study/paper or occasionally accumulated into meta-analyses to explore paradigm-specific questions. Past studies have yet to take the opportunity to aggregate this micro-level data

into a form that can be used to study macro-level questions as we do in this study of macroeconomic institutions. There is a joint interdependence between micro-level data explored in laboratory studies and the macro-level data studied in the development and political economy literature. This interdependence can be reasonably and tractably investigated. We show that doing so does not require collecting new data but can be accomplished by merging and synthesizing data from both lines of research.

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Table 1: Meta-Studies, Games, and Dependent Variables

Study	Game	Pro-Social Residuals			Nash Residuals		
		Definition	Full	Large	Definition	Full	Large
Abeler et al. (2019)	Lying	.	0	0	Report per Round	142	99
Engel (2011)	Dictator	Giving	532	501	- Giving	532	501
Fiala and Suetens (2017)	Oligopoly	.	0	0	- % Cooperate	21	19
Fiala and Suetens (2017)	Voluntary Contribution	% Cooperate	65	64	- % Cooperate	65	64
Johnson and Mislin (2011)	Trust	% Trust	137	106	- % Trust	137	106
Johnson and Mislin (2011)	Trust	% Trustworthy	116	88	- % Trustworthy	116	88
Mengel (2018)	Prisoners' Dilemma	% Cooperate	55	55	% Defect	55	55
Oosterbeek et al. (2004)	Ultimatum	.	0	0	% Offer	38	25
Oosterbeek et al. (2004)	Ultimatum	.	0	0	% Accept Offer	36	23
Grand Total			905	814		1,142	980

Table 2: Summary Statistics: Nash Sample

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	All Countries			$N > 10$		
	Full Sample mean (sd)	Outliers Removed mean (sd)	VIF	Full Sample mean (sd)	Outliers Removed mean (sd)	VIF
Nash Residuals	0.00524 (1.001)	0.0244 (0.904)		0.0243 (0.999)	0.0389 (0.900)	
World Development Indicators						
Taxes on goods and services (% of revenue)	2.399 (1.493)	2.397 (1.490)	27.616	2.691 (1.320)	2.687 (1.320)	20.822
Military expenditure (% of GDP)	-0.111 (0.456)	-0.110 (0.456)	38.337	-0.0718 (0.466)	-0.0708 (0.466)	49.960
Worldwide Governance Indicators						
Political Stability and Absence of Violence/Terrorism	0.583 (0.755)	0.585 (0.753)	19.274	0.667 (0.679)	0.667 (0.680)	17.304
Government Effectiveness	1.290 (0.812)	1.291 (0.811)	125.338	1.443 (0.660)	1.442 (0.659)	82.360
Regulatory Quality	1.228 (0.785)	1.229 (0.783)	111.162	1.381 (0.617)	1.381 (0.615)	70.305
Rule of Law	1.288 (0.896)	1.289 (0.895)	281.469	1.454 (0.733)	1.454 (0.732)	210.148
Control of Corruption	1.255 (0.936)	1.256 (0.935)	97.397	1.425 (0.760)	1.424 (0.759)	67.595
Fraser World Economic Freedom Index						
Size of Government	0.168 (0.757)	0.165 (0.757)	21.249	0.162 (0.734)	0.159 (0.734)	19.623
Property Rights	1.234 (0.870)	1.235 (0.868)	91.337	1.405 (0.690)	1.405 (0.691)	87.972
Sound Money	0.818 (0.597)	0.820 (0.597)	28.842	0.946 (0.318)	0.946 (0.318)	13.732
Trade	0.716 (0.524)	0.718 (0.523)	17.999	0.802 (0.392)	0.803 (0.390)	11.497
Regulatory Freedom	0.771 (0.840)	0.770 (0.838)	14.585	0.884 (0.761)	0.880 (0.763)	15.008
EFI Total	0.997 (0.703)	0.998 (0.701)	47.028	1.130 (0.570)	1.128 (0.569)	43.518
Observations	1,142	1,126	1,126	980	966	966
Number of Countries	70	70	70	19	19	19

Notes: Outliers are defined as $|\text{Nash Residual}| > 3$. Summary statistics for the Pro-Social Residual sample are observed are shown in Table A.1

Table 3: Experimental Studies by Country

Country	Pro-Social Resid		Nash Resid	
	(1)	(2)	(3)	(4)
	Full	Outliers	Full	Outliers
	Sample	Removed	Sample	Removed
	N	N	N	N
Austria	19	19	21	21
Bolivia	20	20	23	23
Canada	28	27	28	27
China	16	16	21	20
Columbia	-	-	12	12
France	16	16	19	19
Germany	96	96	129	128
Israel	-	-	20	20
Italy	23	23	27	27
Japan	10	10	15	15
Kenya	12	12	15	15
Netherlands	17	16	27	26
South Africa	27	27	29	29
Spain	26	25	31	30
Sweden	55	55	58	58
Switzerland	25	23	34	32
Tanzania	-	-	19	18
United Kingdom	52	52	63	62
United States	348	341	389	384
Grand Total	790	780	980	951

Notes: Each cell contains the number of studies conducted in a countries for which Pro-Social or Nash Residuals are defined. Only countries with ten or more studies are shown in the table. Outliers are defined as $| \text{Nash Residual} | > 3$.

Table 4: Effect of World Development Indicators on Residuals

VARIABLES	(1)	(2)	(3)	(4)
	Pro-Social		Nash	
	Full	$N > 10$	Full	$N > 10$
	coeff (se) {q}	coeff (se) {q}	coeff (se) {q}	coeff (se) {q}
Taxes on goods and services (% of revenue)	-0.0881 (0.089) {0.246}	-0.0810 (0.091) {0.410}	0.0429 (0.082) {1.000}	0.0444 (0.082) {0.910}
R^2	0.078	0.040	0.088	0.027
Military expenditure (% of GDP)	-0.2097*** (0.062) {0.009}	-0.2214*** (0.049) {0.008}	0.1090 (0.133) {0.844}	0.1170 (0.003) {0.751}
R^2	0.078	0.040	0.088	0.027
Observations	894	804	1,126	966
Number of Countries	48	16	70	19

Notes: All specifications are estimated on data with outliers removed and include country-level fixed effects. Standard errors are clustered at the country level. Outliers are defined as $|\text{Nash Residual}| > 3$. Specifications labeled “Full” (odd numbered columns) are estimated on using all countries. Even numbered columns are estimated for countries with ten or more observations. Sharpened False Discovery Rate (FDR) q-values are computed from clustered p-values as in Anderson (2008). *** $q < 0.01$, ** $q < 0.05$, * $q < 0.1$.

Table 5: Effect of Worldwide Governance Indicators on Residuals

VARIABLES	(1)	(2)	(3)	(4)
	Pro-Social		Nash	
	Full	$N > 10$	Full	$N > 10$
	coeff (se) {q}	coeff (se) {q}	coeff (se) {q}	coeff (se) {q}
Political Stability and Absence of Violence/Terrorism	-0.0610 (0.096) {0.318}	-0.0450 (0.087) {0.503}	0.1119 (0.107) {0.844}	0.1110 (0.110) {0.751}
R^2	0.077	0.039	0.089	0.028
Government Effectiveness	1.0621*** (0.335) {0.009}	1.0515** (0.343) {0.023}	-0.2505 (0.327) {0.844}	-0.3735 (0.312) {0.751}
R^2	0.088	0.051	0.089	0.029
Regulatory Quality	0.4775* (0.244) {0.079}	0.4179 (0.247) {0.129}	-0.0164 (0.273) {1.000}	-0.0361 (0.289) {1.000}
R^2	0.080	0.041	0.088	0.027
Rule of Law	-0.7192 (0.597) {0.186}	-0.4668 (0.677) {0.434}	0.8263 (0.411) {0.240}	0.7045 (0.481) {0.599}
R^2	0.079	0.040	0.092	0.030
Control of Corruption	0.4840* (0.218) {0.059}	0.5720* (0.272) {0.086}	-0.2871 (0.142) {0.240}	-0.3063 (0.139) {0.331}
R^2	0.082	0.044	0.090	0.029
Observations	894	804	1,126	966
Number of Countries	48	16	70	19

Notes: All specifications are estimated on data with outliers removed and include country-level fixed effects. Standard errors are clustered at the country level. Outliers are defined as $|\text{Nash Residual}| > 3$. Specifications labeled “Full” (odd numbered columns) are estimated on using all countries. Even numbered columns are estimated for countries with ten or more observations. Sharpened False Discovery Rate (FDR) q-values are computed from clustered p-values as in Anderson (2008). *** $q < 0.01$, ** $q < 0.05$, * $q < 0.1$.

Table 6: Effect of Fraser World Economic Freedom Index on Residuals

VARIABLES	(1)	(2)	(3)	(4)
	Pro-Social		Nash	
	Full	$N > 10$	Full	$N > 10$
	coeff (se) {q}	coeff (se) {q}	coeff (se) {q}	coeff (se) {q}
Size of Government	0.2797* (0.133) {0.067}	0.2894* (0.136) {0.086}	-0.1185 (0.152) {0.844}	-0.1366 (0.153) {0.751}
R^2	0.082	0.045	0.089	0.028
Property Rights	0.0218 (0.243) {0.513}	0.0562 (0.224) {0.593}	-0.0257 (0.189) {1.000}	-0.0151 (0.207) {1.000}
R^2	0.077	0.039	0.088	0.027
Sound Money	-0.6159 (0.411) {0.119}	-0.3256 (0.476) {0.434}	0.3518 (0.292) {0.844}	0.4923 (0.345) {0.599}
R^2	0.080	0.041	0.090	0.030
Trade	0.1283 (0.316) {0.401}	0.1311 (0.326) {0.531}	-0.0234 (0.167) {1.000}	-0.0103 (0.195) {1.000}
R^2	0.077	0.039	0.088	0.027
Regulatory Freedom	0.6806*** (0.157) {0.002}	0.7594*** (0.142) {0.002}	-0.3639*** (0.101) {0.008}	-0.3879** (0.101) {0.017}
R^2	0.101	0.067	0.100	0.041
EFI Total	0.6296*** (0.194) {0.009}	0.7018*** (0.230) {0.023}	-0.2956 (0.198) {0.544}	-0.3571* (0.205) {0.569}
R^2	0.084	0.043	0.090	0.030
Observations	894	804	1,126	966
Number of Countries	48	16	70	19

Notes: All specifications are estimated on data with outliers removed and include country-level fixed effects. Standard errors are clustered at the country level. Outliers are defined as $|\text{Nash Residual}| > 3$. Specifications labeled “ $N > 10$ ” (odd numbered columns) are estimated using all countries. Even numbered columns are estimated for countries with ten or more observations. Sharpened False Discovery Rate (FDR) q-values are computed from clustered p-values as in Anderson (2008). *** $q < 0.01$, ** $q < 0.05$, * $q < 0.1$.

Table 7: Effect of Institutions on Residual Behavior: Multivariate

VARIABLES	(1)	(2)	(3)	(4)
	Pro-Social Residual		Nash Residual	
	coeff (se)	coeff (se)	coeff (se)	coeff (se)
World Development Indicators				
Taxes on goods and services (% of revenue)	-0.0477 (0.179)	-0.1099 (0.168)	0.0014 (0.115)	-0.0252 (0.096)
Military expenditure (% of GDP)	0.9475 (0.591)	0.7837 (0.986)	-0.1944 (0.293)	-0.3848 (0.338)
Worldwide Governance Indicators				
Political Stability and Absence of Violence/Terrorism	0.0058 (0.147)	0.1458 (0.210)	0.0599 (0.124)	0.0646 (0.182)
Government Effectiveness	1.3140** (0.590)	1.2209** (0.518)	-0.2169 (0.420)	-0.1967 (0.422)
Regulatory Quality	-0.0675 (0.384)	0.0844 (0.389)	0.1065 (0.387)	0.1468 (0.329)
Rule of Law	-0.5703 (0.695)	-0.2308 (1.002)	0.7013 (0.453)	0.4957 (0.480)
Control of Corruption	0.0622 (0.464)	0.2835 (0.638)	-0.1865 (0.325)	-0.1028 (0.401)
Fraser World Economic Freedom Index				
Total	0.7620* (0.430)		-0.3069 (0.280)	
Size of Government		0.1591 (0.262)		0.0087 (0.179)
Property Rights		-0.2423 (0.813)		-0.4598 (0.321)
Sound Money		-0.7987 (0.496)		0.5746** (0.277)
Trade		-0.0424 (0.351)		-0.0214 (0.204)
Regulatory Freedom		0.5917*** (0.217)		-0.4769*** (0.123)
Observations	894	894	1,126	1,126
Number of Countries	48	48	70	70
R^2	0.097	0.118	0.095	0.110
Prob > F	0.000	0.000	0.170	0.000

Notes: Specifications 1 and 2 are estimated using the sample described in Table A.1 Column 2. Specifications 3 and 4 use the sample described in Table 2 Column 2. All specifications are estimated on data with outliers removed and include country-level fixed effects. Outliers are defined as $|\text{Nash Residual}| > 3$. Standard errors are clustered at the country level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 8: Effect of Regulatory Freedom Components on Residuals

VARIABLES	(1)	(2)	(3)	(4)
	Pro-Social		Nash	
	Full coeff (se)	$N > 10$ coeff (se)	Full coeff (se)	$N > 10$ coeff (se)
Freedom from Credit Market Regulations				
Bank Ownership	0.0749* (0.037)	0.0490 (0.058)	-0.0182 (0.026)	-0.0237 (0.030)
Private Sector Credit	0.0363 (0.023)	0.0538* (0.027)	-0.0436** (0.021)	-0.0456* (0.023)
Interest Rate Controls	0.2797*** (0.071)	0.3624*** (0.089)	-0.1941*** (0.069)	-0.3263*** (0.093)
Freedom from Labor Market Regulations				
Hiring Reg/Minimum Wage	0.0948*** (0.032)	0.1035*** (0.031)	-0.0678** (0.029)	-0.0748** (0.026)
Hiring/Firing Reg	0.0034 (0.112)	0.0704 (0.140)	0.0719 (0.090)	0.0065 (0.104)
Collective Bargaining	-0.1420 (0.116)	-0.2561* (0.144)	0.1352 (0.111)	0.2560* (0.133)
Hours Regulations	-0.0656 (0.052)	-0.0980* (0.054)	0.0350 (0.037)	0.0685* (0.034)
Worker Dismissal	0.1762*** (0.058)	0.2363*** (0.043)	-0.1633** (0.073)	-0.2396*** (0.062)
Conscription	0.0991*** (0.023)	0.0789*** (0.025)	-0.0558* (0.030)	-0.0389 (0.028)
Freedom from Business Regulations				
Administrative Requirements	0.2199*** (0.047)	0.2179*** (0.052)	-0.1615*** (0.058)	-0.1641*** (0.055)
Regulatory Burden	-0.0007 (0.025)	0.0051 (0.023)	-0.0099 (0.030)	-0.0073 (0.026)
Starting A Business	-0.1257* (0.066)	-0.0912 (0.072)	0.2043* (0.110)	0.1483 (0.098)
Impartial Public Admin	-0.7984 (0.485)	-0.4106 (0.577)	0.0106 (0.238)	0.1740 (0.262)
Tax Compliance	-0.0605 (0.048)	-0.0413 (0.039)	0.0225 (0.038)	0.0511 (0.036)
Observations	804	702	988	850
Number of Countries	44	16	65	19
R^2	0.142	0.104	0.136	0.093

Notes: All specifications are estimated on data with outliers removed and include country-level fixed effects. Standard errors are clustered at the country level. Outliers are defined as $| \text{Nash Residual} | > 3$. Specifications labeled “Full” (odd numbered columns) are estimated using all countries. Even numbered columns are estimated for countries with ten or more observations. Standard errors are clustered at the country level. *** $q < 0.01$, ** $q < 0.05$, * $q < 0.1$.

A Appendix

A.1 Instructions to Coders

Coding Process:

1. Code Papers

- a. Use Excel file “Meta Data in Our Format”
 - i. Each of the first 8 “tabs” correspond to a meta-analysis paper/topic.
 - ii. See zip-file for each meta-analysis for set of papers to be coded.
 - iii. Each coder will be inputting data one tab at a time. Each coder will have a different order to progress through the tabs. Please follow the pre-specified order of progression provided to you by the researchers.
 - iv. DO NOT sort the rows or manipulate the order that rows or columns appear in the spreadsheets.
 - v. You will only input data into columns that are colored RED (for data) or Purple (where you can indicate any problems or notes or oddities you run across during data entry). Do not edit data in any other column.
 - vi. When moving to a new tab for the first time, please take a few minutes to familiarize yourself with that tabs data format. Each tab has been laid out in a similar way but is somewhat different. The top row gives you a description of variables that you will be filling in, row 2 the variable names, and row 3 a name that connects to how the meta-analysis referred to a certain variable.
 - vii. Each tab pools papers from a different meta-analysis of papers on different topics, as such the data being entered reflects different content. Read the variable descriptions and remind yourself about what kind of “game” these papers represent, to aid in your data entry and skimming each of the papers.
- b. Excel tab will have a column(s) (usually starting at column C) that has a list of papers
 - i. The same paper may occur more than once in the column, indicating multiple treatments. This means you will have to code the paper multiple times. Likely some of the entered data will be the same, but some will likely be different so be aware.
 - ii. Papers will appear multiple times based upon different treatments within a paper. Behavioral data (decision data), following green colored variables in the excel sheet, will likely vary between treatments in each paper, so be sure you have the right treatment for the row you are coding.

- iii. Some meta-analyses will have a variable that describes the difference between treatments that will help you figure out what data to input in a row. If there is no treatment description variable, use information about number of observations in the treatment and within experiment behavioral data (green-colored variables) to identify which treatment a specific row in the data set is referring to.
- c. There will be further columns of data in red that need to be filled and coded with information found in the paper.
 - i. Look at row 1, to see a description of the format of data entry (numerical entry, binary 0 or 1, text entry, etc.)
 - ii. Look at row 2 to see the name of the variable
 - iii. For each Paper you will be looking for the year the data was collected.
 - 1. This information is often found at the end of the design section or the beginning of the results section or when the data of a treatment is presented. If so, make sure you are using the date the data for the specific treatment of the row of data you are coding for a paper (remember some papers have more than one line of data).
 - 2. If the exact year of data collection is not provided, look at the title page and see if the title page notes a date the paper was “received” by the journal. Keep this year in mind. Next, please do a google scholar search of the paper. Underneath the brief abstract of the paper that appears in google scholar you will see links “Cited by” “related articles” “All X versions”. Click on the “All X versions” link. Find the smallest year version (earliest date). Use that date as the year data was collected.
 - 3. Put a note in the “Problems Year Data Collected” column that indicates that you either “Used exact year of collection”, “Used earliest Google Scholar version year”, or “Used journal received date year”,
 - 4. For some meta-analysis papers this data will already appear (typically around column E). This indicates the authors of the meta-analysis put a vague indication or suggestion of when data was collected. Please verify this in the “Alternative Year Data Collected” data column as above.
 - iv. You will see red-colored variables following several green-colored variables that already have coded data. These variables relate to treatment results in each paper (for instance % given by dictators). The data in red may or may not be present in the paper. Often these will be asking you to look and see if the paper indicates the Standard Error of one of the green variables, or will ask if the paper indicates separate data for males and females of data given in green for all participants as a whole. If data is not provided or not exactly as we ask for it please indicate that in the purple column associated with the red colored variable. For red data broken up by gender there will often be many columns for this data (separate main data and standard error data for each gender). There is one purple column

after all of these gender-specific variables (in some circumstances you may see a few extra comment/notes locations which are labeled for their content.). If the gender data is not present or if there are notes about the gender variables that are important, please put it in this column.

- v. When entering IPEDs codes for the university where data was collected (for university sample studies), look at column A in tab “IPEDS Codes”. To find the IPED codes for each university.
- vi. If the Paper indicates the data was collected at an ambiguously named university (for instance “An American University” or “A Private West Coast University”) you will need to do further exploration to find where the University/location is that the data was collected. This is a common type of wording that papers use when they are submitted due to double-blind referee policies. The actual university name is often used in the final published version of the paper or earlier working paper versions of the paper.
 1. Write a Note in the IPEDS Notes/Problem column to indicate this issue. Include an exact copy of the ambiguous language in the notes section.
 2. Do a Google Scholar search of the paper title.
 3. After locating the paper in Google Scholar, please click on the “All X versions” link underneath the paper title. This will typically reveal several other versions of the paper. Find the final version of the paper first that was published in a journal. Download and check whether the language in the final published paper replaced the ambiguous language with a University Name that you can then link to an IPEDs code. If that is also ambiguous look for an earlier working paper or discussion version of the manuscript (NBER, SSRN, REPEC, etc.) and download to look for a university name.
 4. If the other versions of the paper also are ambiguous in university name, fill in the city/state/zip/country columns as if it were a foreign university or a field study with as much information as the paper does provide. For “Boston area public University” you would then put in the name “Boston” for City, and “United States of America” for country.
- vii. For international Universities you will have to Manually search and locate the university location details for city, state/province, zip code, country. Often the contact information for the authors on the paper title page will indicate the address of the university.
- viii. If the paper indicates that the data was collected at multiple universities:
 1. First make sure that this is not already indicated in the excel data entry spreadsheet as multiple “studies” from the same paper.
 2. If the same study ID has more than 1 university, note this in the “IPEDS/City problem/notes” column. Be sure to indicate in the note section whether the paper provides separate data on main treatment average behaviors by university.

3. Whichever university had more data observations use as the primary university. Each subsequent university put IPED/City/State/Zip information in the “IPEDS University 2” or “Ipeds University 3+” columns. Put IPED codes and city information all in the same column.
- d. There will be further columns of data in red that need to be filled and coded with information found in the paper.
 - i. Look at row 1, to see a description of the format of data entry (binary 0 or 1, text entry, etc.)
 - ii. Look at row 2 to see the name of the variable
 - e. There will be columns of data in purple that correspond to each of the columns in red, and two additional purple columns. These are to indicate any problems with the data entry (for instance if the data is not in the paper indicate that here).
 - i. Indicate in these columns if the data is not present in the paper
 - ii. Indicate in these columns if there is ambiguity/uncertainty about the number you are entering (for example, if we are asking you to input the standard error of their main experiment variable, and you can only find the standard deviation, then put the standard deviation in the data column but tell us in the notes section that it is not exactly what we asked for but close.)
 - iii. The First purple column (column 1 in each tab) is there to indicate other additional coding notes about that paper that you thought we should know.
 - iv. The last purple column occurs after the yellow/red data columns. It is there to indicate other additional coding notes about those data points you thought we should know. Indicate here any problems/variations from instructions, ambiguities, etc. that impacted those yellow variables.

Table A.1: Summary Statistics: Pro-Social Sample

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	All Countries			$N > 10$		
	Full Sample mean (sd)	Outliers Removed mean (sd)	VIF	Full Sample mean (sd)	Outliers Removed mean (sd)	VIF
Pro-Social Residuals	-0.00618 (1.002)	-0.0365 (0.919)		-0.0357 (1.007)	-0.0649 (0.925)	
World Development Indicators						
Taxes on goods and services (% of revenue)	2.592 (1.424)	2.585 (1.423)	39.910	2.900 (1.179)	2.892 (1.182)	29.314
Military expenditure (% of GDP)	-0.0957 (0.437)	-0.0958 (0.436)	89.463	-0.0757 (0.419)	-0.0763 (0.418)	86.525
Worldwide Governance Indicators						
Political Stability and Absence of Violence/Terrorism	0.630 (0.709)	0.629 (0.710)	24.841	0.737 (0.572)	0.736 (0.572)	20.008
Government Effectiveness	1.359 (0.762)	1.357 (0.762)	157.222	1.502 (0.595)	1.499 (0.597)	106.749
Regulatory Quality	1.292 (0.737)	1.291 (0.737)	141.755	1.433 (0.566)	1.430 (0.568)	94.158
Rule of Law	1.362 (0.845)	1.360 (0.847)	519.546	1.517 (0.678)	1.513 (0.681)	372.124
Control of Corruption	1.337 (0.872)	1.335 (0.873)	133.755	1.492 (0.683)	1.489 (0.686)	84.865
Fraser World Economic Freedom Index						
Size of Government	0.200 (0.745)	0.196 (0.745)	27.705	0.193 (0.737)	0.187 (0.737)	26.434
Property Rights	1.324 (0.811)	1.322 (0.813)	224.970	1.483 (0.626)	1.481 (0.630)	144.563
Sound Money	0.887 (0.416)	0.886 (0.416)	37.764	0.979 (0.275)	0.978 (0.277)	21.557
Trade	0.761 (0.453)	0.761 (0.453)	22.694	0.840 (0.328)	0.840 (0.329)	13.801
Regulatory Freedom	0.832 (0.793)	0.828 (0.793)	21.152	0.943 (0.728)	0.938 (0.729)	19.030
EFI Total	1.076 (0.626)	1.073 (0.626)	69.741	1.192 (0.526)	1.188 (0.528)	53.431
Observations	905	894	894	790	780	780
Number of Countries	48	48	48	16	16	16

Notes: Outliers are defined as $| \text{Pro-Social Residual} | > 3$.

Table A.2: Experimental Studies by Country: $N < 10$

Country	Full Sample N	Outliers Removed N	Country	Full Sample N	Outliers Removed N
Argentina	7	6	Madagascar	1	1
Australia	5	5	Malaysia	3	3
Bangladesh	9	9	Mexico	1	1
Belgium	1	1	Morocco	1	1
Belgium/Norway/Italy	2	2	Netherlands/Austria	4	4
Brazil	5	5	New Zealand	7	7
Cameroon	4	4	Nigeria	1	1
Chile	6	6	Norway	5	5
Costa Rica	2	2	Papua New Guinea	6	6
Czech Republic	3	3	Paraguay	4	4
DR Congo	1	1	Peru	6	6
Denmark	6	6	Poland	1	1
Fiji	2	2	Portugal	2	2
Finland	1	1	Romania	4	4
France/Germany	4	4	Russia	4	4
Georgia	1	1	Rwanda	1	1
Ghana	1	1	Singapore	1	1
Greece	2	2	Slovakia	1	1
Guatemala	1	1	South Korea	3	3
Honduras	5	5	Thailand	1	1
Hungary	2	2	Turkey	3	3
Iceland	1	1	Uganda	4	4
India	8	8	Uruguay	2	2
Indonesia	4	3	Vietnam	3	3
Lithuania	1	1	Zimbabwe	4	4
Grand Total	162	160			

Notes: Each cell contains the number of studies conducted in a countries for which Nash Residuals are defined. Outliers are defined as $|\text{Nash Residual}| > 3$.

Table A.3: Summary Statistics - Components of Regulatory Freedom

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Pro-Social			Nash		
	Full mean (sd)	$N > 10$ mean (sd)	VIF	Full mean (sd)	$N > 10$ mean (sd)	VIF
Freedom from Credit Market Regulations						
Bank Ownership	8.614 (2.374)	8.890 (2.115)	11.296	8.423 (2.456)	8.660 (2.260)	9.990
Private Sector Credit	8.136 (2.107)	8.032 (2.180)	3.411	8.205 (2.030)	8.114 (2.085)	3.549
Interest Rate Controls	9.805 (0.593)	9.866 (0.443)	9.143	9.756 (0.813)	9.867 (0.439)	3.442
Freedom from Labor Market Regulations						
Hiring Reg/Minimum Wage	7.465 (2.517)	7.620 (2.463)	8.169	7.378 (2.547)	7.552 (2.479)	8.302
Hiring/Firing Reg	4.995 (1.971)	5.095 (2.031)	33.102	4.957 (1.953)	5.065 (1.985)	48.003
Collective Bargaining	6.274 (2.075)	6.275 (2.159)	49.312	6.222 (2.040)	6.235 (2.113)	72.690
Hours Regulations	7.838 (2.054)	7.868 (2.037)	9.254	7.825 (2.029)	7.877 (1.991)	10.562
Worker Dismissal	7.888 (2.588)	8.205 (2.314)	100.939	7.697 (2.740)	8.027 (2.445)	83.648
Conscription	7.999 (3.337)	8.239 (3.100)	29.304	7.843 (3.443)	8.005 (3.330)	26.503
Freedom from Business Regulations						
Administrative Requirements	3.976 (1.143)	4.072 (1.122)	3.049	3.992 (1.191)	4.102 (1.161)	2.632
Regulatory Burden	5.615 (2.121)	5.730 (2.173)	3.442	5.932 (2.187)	6.037 (2.213)	3.360
Starting A Business	9.361 (0.707)	9.479 (0.548)	13.872	9.325 (0.816)	9.459 (0.557)	6.708
Impartial Public Admin	9.231 (1.751)	9.581 (1.222)	129.899	9.051 (1.912)	9.426 (1.410)	92.616
Tax Compliance	7.312 (1.470)	7.445 (1.237)	10.387	7.334 (1.467)	7.474 (1.230)	6.765
Observations	804	702	702	988	850	850
Number of Countries	44	16	16	65	19	19

Table A.4: Effect of Institutions on Residual Behavior: Multivariate, $N \geq 10$

VARIABLES	(1)	(2)	(3)	(4)
	Pro-Social Residual		Nash Residual	
	coeff (se)	coeff (se)	coeff (se)	coeff (se)
World Development Indicators				
Taxes on goods and services (% of revenue)	-0.0401 (0.192)	-0.0468 (0.185)	0.0094 (0.121)	-0.0317 (0.107)
Military expenditure (% of GDP)	1.0217 (0.635)	0.7080 (1.187)	-0.2714 (0.347)	-0.5280 (0.410)
Worldwide Governance Indicators				
Political Stability and Absence of Violence/Terrorism	0.0335 (0.162)	0.2382 (0.211)	0.0662 (0.141)	0.0934 (0.225)
Government Effectiveness	1.3645* (0.660)	1.0911* (0.607)	-0.4209 (0.422)	-0.3927 (0.413)
Regulatory Quality	-0.4369 (0.385)	-0.3008 (0.475)	0.3250 (0.415)	0.3167 (0.351)
Rule of Law	-0.0336 (0.848)	0.2125 (1.358)	0.4215 (0.515)	0.2363 (0.622)
Control of Corruption	0.2506 (0.553)	0.6213 (0.787)	-0.1971 (0.343)	-0.0605 (0.459)
Fraser World Economic Freedom Index				
Total	0.9739** (0.425)		-0.4373 (0.348)	
Size of Government		0.1043 (0.309)		0.0096 (0.201)
Property Rights		-0.2451 (0.886)		-0.6684* (0.363)
Sound Money		-0.4951 (0.609)		0.6228 (0.470)
Trade		0.0398 (0.372)		-0.0170 (0.255)
Regulatory Freedom		0.7145*** (0.218)		-0.5580*** (0.157)
Observations	780	780	966	966
Number of Countries	16	16	19	19
R^2	0.057	0.077	0.036	0.054
Prob > F	0.000	0.000	0.253	0.000

Notes: Specifications 1 and 2 are estimated using the sample described in Table A.1 Column 5. Specifications 3 and 4 use the sample described in Table 2 Column 5. All specifications are estimated using data from countries with a minimum of ten studies, outliers removed and include country-level fixed effects. Outliers are defined as $|\text{Nash Residual}| > 3$. Standard errors are clustered at the country level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.5: Effect of Institutions on Residual Behavior: Multivariate, Full Sample

VARIABLES	(1)	(2)	(3)	(4)
	Pro-Social	Residual	Nash	Residual
	coeff (se)	coeff (se)	coeff (se)	coeff (se)
World Development Indicators				
Taxes on goods and services (% of revenue)	-0.0854 (0.172)	-0.1629 (0.150)	0.0851 (0.100)	0.0672 (0.100)
Military expenditure (% of GDP)	1.0193 (0.672)	0.7576 (0.981)	-0.1142 (0.315)	-0.2587 (0.359)
Worldwide Governance Indicators				
Political Stability and Absence of Violence/Terrorism	-0.0494 (0.175)	0.0829 (0.216)	0.1882 (0.162)	0.2290 (0.233)
Government Effectiveness	1.0375 (0.689)	0.8911 (0.595)	-0.0285 (0.519)	-0.0374 (0.558)
Regulatory Quality	0.0993 (0.405)	0.2910 (0.435)	-0.0704 (0.381)	-0.0008 (0.323)
Rule of Law	-0.5104 (0.662)	-0.0043 (0.914)	0.6034 (0.584)	0.3735 (0.606)
Control of Corruption	0.1089 (0.474)	0.3655 (0.643)	-0.0955 (0.349)	0.0290 (0.426)
Fraser World Economic Freedom Index				
Total	0.7294 (0.570)		-0.0948 (0.322)	
Size of Government		0.1063 (0.255)		0.0280 (0.207)
Property Rights		-0.3499 (0.772)		-0.3952 (0.289)
Sound Money		-1.0142** (0.430)		0.6511*** (0.240)
Trade		0.0073 (0.200)		-0.0925 (0.174)
Regulatory Freedom		0.6579*** (0.203)		-0.3155** (0.151)
Observations	905	905	1,142	1,142
Number of Countries	48	48	70	70
R^2	0.098	0.121	0.094	0.102
Prob > F	0.0150	4.20e-06	0.0490	1.89e-07

Notes: Specifications 1 and 2 are estimated using the sample described in Table A.1 Column 1. Specifications 3 and 4 use the sample described in Table 2 Column 1. All specifications include country-level fixed effects. Outliers are defined as $|\text{Nash Residual}| > 3$. Standard errors are clustered at the country level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.