

Cultural Context: Explaining the Productivity of Capitalism

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I. INTRODUCTION

Culture, an informal institution, demonstrates a strong association with economic performance (Guiso et al. 2006; Licht et al. 2007; Tabellini 2008, 2009; Williamson and Mathers 2010), but what exactly is the mechanism or process through which culture impacts economic outcomes? Scholars as early as Montesquieu, Weber, and Hume acknowledge that cultural norms can influence economic performance. A possible mechanism stems from culture's ability to affect the success of formal rules and constraints (for example, see Boettke and Coyne 2009; C. Williamson 2009). O. Williamson (2000) argues that formal institutions are likely to be short-lived if they conflict with cultural norms, given the lengthy time period generally required for significant changes in the culture and norms of a society. We hypothesize that one mechanism through which culture may affect economic outcomes is by either enhancing or diminishing the effects of economic institutions, specifically capitalist institutions.

Economic institutions, such as private property, rule of law, and contract enforcement are critical for economic growth and development. Despite a considerable amount of literature devoted to this topic, understanding *how* these institutional constraints determine development remains a mystery. Given the wide range of success and failure with establishing credible institutions, it is important to address potential causal factors underlying the effectiveness or ineffectiveness of institutional constraints. Our paper attempts to understand the success or failure of economic institutions, specifically economic freedom, by incorporating the role of culture.

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We argue that there are certain cultural attributes that either encourage or discourage institutions associated with economic freedom. Following this logic, we claim that the success or failure of formal economic institutions depends on the preexisting informal rules, or culture. Culture has the ability to raise or lower the productivity of economic freedom by acting as a filter through which the constraints must pass; thus, certain cultural attributes may complement economic freedom, or capitalism, and enhance its subsequent effect on growth. This implies that culture is capable of complementing and enhancing economic freedom's effect on economic outcomes by making the constraints more credible, and ultimately, binding.¹

The analysis examines how the interaction between culture and economic freedom affects economic prosperity, an empirical study that has, thus far, been absent from the economic literature. Our contribution lies at an intersection between the economic growth-economic freedom literature and the emerging studies examining how culture matters for economic performance.² More generally, the analysis can be viewed as a contribution to the literature attempting to understand how institutions matter for economic development. The primary goal of the analysis is to understand how culture affects capitalism's ability to influence economic growth. By incorporating culture into the analysis, we may partially explain why the 'same' economic institutions translate into different economic outcomes.

To empirically discover whether culture enhances the productivity of capitalism, we create an unbalanced panel dataset spanning from 1980 to 2004, using five-year averages across 74 countries. Our dependent variable is the growth rate of GDP per capita, and our main variable of interest is the interaction between economic freedom and culture. We view the interaction term as demonstrating culture's impact on the productivity of capitalism. To measure economic institutions, we rely on the widely used Economic Freedom of the World Index compiled by the Fraser Institute (Gwartney, Lawson, and Norton 2008). For culture, we utilize a measure created from the World Values Surveys that captures the level of trust, respect, self-determination, and obedience in order to generate an overall culture index (Tabellini 2008, 2009; Williamson and Kerekes 2010). To create the interaction term, we simply multiply the culture index with the economic freedom index.³

1. This is similar to an argument by North (2005) where formal and informal institutions contribute to economic growth through a feedback process.
2. For an analysis of the impact of culture on economic growth, see, for example, Williamson and Mathers 2010; Boettke and Coyne 2009; Pejovich 2003; Zak and Knack 2001; Francois and Zbojnik 2005.
3. We restrict the sample to only those countries with data for both economic freedom and culture; therefore, we do not mean adjust the interaction term.

Our investigation employs fixed effects estimation with a variety of different control variables. In addition, we provide several sensitivity checks to our model. Overwhelming, we find that our measure of culture does, in fact, enhance the effectiveness of economic institutions. Our results also suggest that economic freedom independently, thus directly, contributes to economic prosperity, though its effectiveness is strongly enhanced by cultural values.

II. THEORETICAL LINKS

The hypothesis that the interaction between formal institutions of capitalism and informal cultural norms will significantly affect growth is well supported by existing theory. As defined by North (1990), institutions can be thought of as the ‘rules of the game,’ both formal and informal, which govern actions through incentives. Formal institutions are codified structures or written rules, whereas informal institutions are inclusive of cultures, norms, and conventions enforced by social custom.

Boettke, Coyne, and Leeson (2008) suggest that in order for formal institutions to ‘stick’ and, thus, promote economic growth and development, formal institutions must map onto the informal rules.⁴ This implies that informal and formal institutions should complement one another in order to be self-enforcing and support economic growth.⁵ As Hume (Hendel, ed. 1953) put it, the ‘ancient fabric’ of a society must be considered when creating or making changes to an existing set of formal institutions.

This begs the question: ‘Which institutions, both formal and informal, are compatible with each other and economic growth?’ One answer lies in Weber’s (1905, p. 19) explication of the ‘spirit of capitalism,’ which he defines as the attitude (i.e. culture) that ‘strives systematically for profit for its own sake.’ Weber’s thesis described the Protestant ethic, or culture, as one important determinant in the emergence of capitalism in northern Europe. Likewise, Tocqueville (1835) described a culture in America with attributes similar to some of those later associated with Weber’s Protestant ethic. More recently, McCloskey (2009) states that the main cause of the industrial revolution was an increase in entrepreneurship brought about by a change in cultural values. Hence, it was the match between the informal and formal institutions,

4. The relationship between formal and informal institutions and economic development is empirically analyzed in C. Williamson (2009).
5. Both Weber (1905) and North (2005) investigate the effect of informal institutions on economic outcomes. Additionally, North (1990, 2005) notes that past institutions, both formal and informal, contribute to institutional path dependency, where a country’s past, in part, determines its present. These theoretical arguments are supported by recent empirical studies (Acemoglu et al. 2001, 2002; Rodrik et al. 2004; Acemoglu and Johnson 2005).

or cultural values coupled with economic freedom, that sparked the industrial revolution.⁶

More recent empirical studies have shown that culture can shape institutions, but institutions can also have an effect on culture. In other words, endogeneity is a key concern in any study including both institutions and culture. As Tabellini (2008) points out, culture evolves endogenously and is impacted by past institutional arrangements. Since culture is long-lasting and changes much more gradually than many formal institutional arrangements, the culture consistent with past institutions may persist and impact current economic outcomes. In short, both culture and formal institutions influence each other, and, as Tabellini (2008) puts it, they have ‘mutually reinforcing effects.’

Only recently have studies emerged empirically demonstrating the role of specific cultural measures in economic development and growth. For example, both Grier (1997) and Barro and McCleary (2003) examine the impact of religion on economic development and can be thought of as recent attempts to estimate the effects of cultural ethics discussed in the work of Weber and others. Several studies investigate how informal institutions are important for economic outcomes (Guiso et al. 2006; Licht et al. 2007; Tabellini 2008, 2009). Tabellini (2009) finds a strong causal and direct relationship between culture and economic development across different European countries. In addition, Licht et al. (2007) and Williamson and Kerekes (2010) empirically demonstrate that culture indirectly promotes economic prosperity. Leeson, Peter (2007) and Powell, Ford, and Nowrasteh (2008) argue that in some cases, relying on informal institutions alone can provide better outcomes than those achieved with a corrupt government. This suggests that culture is capable of substituting for and providing functions traditionally attributed to formal institutions.

More recently, Williamson and Mathers (2010) demonstrate that when controlling for both economic freedom and culture simultaneously, culture’s direct impact on growth is greatly diminished, while economic freedom displays a robust positive relationship with growth. One could interpret this finding as suggesting that culture is not important for economic performance; however, we view this result as suggesting that culture’s effect may be better understood by analyzing its ability to enhance economic freedom. Our paper builds from this previous work to analyze how culture and capitalism may complement one another, whereas previous studies focused on their substitution effects. No empirical paper has yet examined the interaction between the two variables in order to understand the role of culture in explaining economic outcomes *viz-a-vie* the enhancement of capitalism.

6. Powell and Rodet (2009) empirically show that social approval of economic freedom increases the rate of entrepreneurship.

III. DATA SUMMARY

3.1 *Economic Freedom*

To measure economic freedom, we utilize the well cited and established Economic Freedom of the World Index compiled by the Fraser Institute (Gwartney et al. 2008). The index measures the level of economic freedom on a scale from zero to ten, with ten representing a greater degree of freedom. These components can be grouped in five broad categories: size of government, legal structure and security of private property rights, freedom to trade with foreigners, regulation of credit, labor, and business, and access to sound money.⁷

3.2 *Culture*

To quantify culture, we focus on several specific indicators of culture that are identified as being relevant for supporting the capitalist foundation of economic interaction and exchange. One can think of this subset as ‘economic culture,’ defined by Porter (2000) as ‘the beliefs, attitudes, and values that bear on economic activities of individuals, organizations, and other institutions’ (p. 14). Narrowing the concept of culture allows us to explore how specific cultural traits interact with economic institutions and affect economic growth.

To measure culture we rely on a variable first identified by Tabellini (2008, 2009) and later expanded on by Williamson and Kerekes (2010). This variable is constructed by identifying four distinct categories of culture that should constrain behavior related to social and economic interaction. These four components are trust, respect, individual self-determination, and obedience. These traits serve as rules governing interaction between individuals, including market production and entrepreneurship. Trust, respect, and individual self-determination are thought to stimulate social and economic interaction, whereas obedience is thought to limit economic interaction and development by decreasing risk-taking, a trait essential to entrepreneurship.

All four of these cultural components create legitimacy for capitalism. Countries rich in trust, respect, and individual self-determination and lacking a strong sense of obedience provide legitimacy for formal institutions of capitalism and economic freedom. For example, trust, respect, and individual

7. We recognize the availability of alternative institutional indices (such as Heritage Foundation’s Index of Economic Freedom and ICRG’s average protection against risk of expropriation); however, due to the long time period and sample size of countries covered by the Fraser index, we find it to be the most suitable for our analysis. For an in-depth explanation of and comparison between the Fraser freedom index and Heritage’s freedom index, see De Haan and Sturm (2000).

self-determination all relate to the Protestant ethic described by Weber. In order to embody the 'spirit of capitalism,' trust is essential, as a lack of trust erodes potential trading arrangements, limiting economic profits and the level of investment individuals can attain.⁸ Respect is a measure of generalized versus limited morality, where generalized morality implies abstract rules governing behavior both within and between groups. In a country with low levels of respect, limited morality may be the status quo, making opportunistic behavior morally condoned when interacting with those outside of an individual's small group, thus rendering future mutually beneficial trade virtually impossible (Platteau 2000).

Individual self-determination relates to the Protestant ethic through the ideals of personal culpability and hard work. If individuals view economic success or failure as a result of their own efforts (i.e. individuals have high levels of self-determination), they will work harder in order to earn a greater payoff for their productivity and increase their welfare. According to this line of reasoning, the greater an individual's 'locus of control,' the greater the overall level of economic development in their country (Banfield 1958). The final trait, obedience, can diminish positive effects from capitalism. If children are taught to be obedient and individualism is frowned upon, children may have lower levels of autonomy and, thus, be less likely to engage in the risk-taking essential for entrepreneurship (Harper 2003).

Data from the European and World Values Surveys is utilized to quantify each component. These surveys capture individual beliefs and values reflecting local norms and customs, i.e. culture. In order to maximize sample size, we pool all countries surveyed in any of the five waves from the time periods 1981–84, 1989–1993, 1994–1999, 1999–2004, and 2005–2007. Survey answers are aggregated to create the culture variable for each period. In order to correctly capture these categories, one question from the survey is identified that is most closely correlated with each trait. For example, trust is measured by the question, 'Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?' Self-determination is measured using the question, 'Some people feel they have completely free choice and control over what happens to them. Please use this scale (from 1 to 10) where 1 means 'none at all' and 10 means 'a great deal' to indicate how much freedom of choice and control in life you have over the way your life turns out.'

To measure respect, the following question is used: 'Here is a list of qualities that children can be encouraged to learn at home. Which, if any, do you consider to be especially important? Please choose up to five.' The percentage of

8. For a study illustrating how economic freedom promotes generalized trust, see Berggren and Jordahl (2006).

those surveyed who chose ‘tolerance and respect for other people’ is used to measure respect. The same question was used to measure obedience, but in this case, the percentage of those surveyed that chose obedience as important for children to learn at home is used as our variable.

Individual responses from each of the four questions are aggregated for each country. A comprehensive culture measure is achieved by extracting the first principal components of all four traits. This process extracts the common variation between all four traits; therefore, the index should be thought of as a net measure of culture that is conducive to economic interaction and exchange. The index is normalized between zero and ten, with a higher score implying stronger informal norms that support economic growth relative to countries with lower scores. In order to maximize our number of periods for the panel data, the culture variable is constructed as follows. The first wave of surveys (1981–84) represents culture in the time period 1984. The second wave (1989–1993) is used to create the culture variable in the period 1989. The surveys from 1994–1999 are used to create culture for the period 1994. The fourth wave, from 1999–2001, represents the culture variable for 1999, and the latest wave is used to create the culture variable for the period 2004.

3.3 Control Variables

In addition to economic freedom and the interaction term, we also employ a variety of control variables that may affect a country’s growth rate. We follow the existing literature on economic freedom and growth and development in selecting our variables (for example, Levine and Renelt 1992; Dawson 1998; Acemoglu et al. 2001, 2002; Gwartney et al. 2004). Our controls include initial real GDP per capita in 2000 constant dollars (log form) as a conditioning variable, the investment share of real GDP (2000 constant dollars), population growth rate, urban population, and country size.⁹ Appendix 1 provides a summary description of all data used in the analysis along with their sources.

IV. EMPIRICAL ANALYSIS AND RESULTS

We implement panel analysis on an unbalanced dataset ranging from 1980 to 2004 using five-year averages. We restrict our sample to only include those countries where data is available for both economic freedom and culture in

9. In addition to these standard controls, a measure of human capital or the level of education is often controlled for as well. However, we do not control for human capital in our main specification, but add it in the robustness section, due to the high correlation between education measures and the interaction term (see Appendix 2).

each period. This will vary from period to period, resulting in an unbalanced panel. We first provide a benchmark specification as a baseline and a comparison with previous studies. We then turn to our main model specification, where we incorporate a combination of our main variables and our control vectors.

Throughout the analysis, we use a variety of regression specifications in order to follow the pre-existing literature, provide robustness, and minimize endogeneity concerns. We recognize that many of our variables are correlated with one another (see Appendix 2 for a pairwise correlation matrix). For example, initial economic freedom (0.75) and culture (0.94) are highly correlated with our main variable, the economic freedom/culture interaction term. Culture and freedom are also strongly correlated with each other (0.52), as well as investment, initial GDP per capita, and urban population.

In order to substantiate our results, we rely on a variety of regression specifications and acknowledge the presence of endogeneity among our independent variables.¹⁰ Our specifications include controlling for initial economic freedom (the freedom score at the beginning of the period), culture, and the interaction term separately as well as jointly.¹¹ Because of the high correlation between freedom, culture, and the interaction term, we first present a reduced form of the model where we only control for initial freedom and the interaction term. Then we turn to a more complete specification including all three variables. We do so for two reasons. First, this presents the ‘toughest’ case for the importance of our main variable. Second, this allows us to interpret the coefficient from the interaction term with more accuracy. However, we want to emphasize that we do not place much weight on the sign/significance from the coefficients of initial freedom or culture in this specification due to the high correlations mentioned above. Next, we add the controls in two stages to minimize endogeneity. All regressions are reported controlling for initial income.

Summary statistics for all variables used in the analysis are provided in Table 1. We use panel data with 74 countries, spanning from 1980 to 2004 (creating 5 points in time with five-year averages), with income per capita averaging \$13,512 and ranging from \$760 (Nigeria 2004) to \$42,782 (Luxembourg 1999).

The average growth rate is 3.27 with a standard deviation of 2.49. Initial economic freedom has a minimum score of 3.70 (Brazil 1989) and a maximum of 8.85 (Hong Kong 2004), with a mean of 6.22 and a standard deviation

10. Due to the focus on the interaction term, we do not find instrumental variable analysis appropriate for our empirical specification.
11. We only control for initial economic freedom and do not include changes in freedom in our regressions. For a theoretical discussion involving the ‘correct’ model specification, see De Haan et al. 2006 and Lawson 2006.

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Table 1
Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Growth	182	3.27	2.49	- 5.46	10.86
GDP pc	181	13,512	9,186	760	42,782
Initial gdppc (log)	184	9.13	0.89	6.76	10.50
Culture	186	4.95	1.95	0.00	10.00
Initial econ freedom	186	6.22	1.26	3.70	8.85
Cult ^a econ freedom	186	32.01	16.50	0.00	72.68
Invest/GDP	185	18.49	7.24	3.28	39.36
Pop. Growth	183	0.89	0.94	- 1.28	3.38
Urban pop. %	183	66.38	18.67	11.79	100.00
Area (log)	181	12.77	1.98	5.77	16.61
Primary School rate	48	0.53	0.25	0.06	0.97
Latitude	171	0.26	0.17	0.01	0.69
English legal origin	171	0.43	0.50	0.00	1.00
French legal origin	171	0.37	0.48	0.00	1.00

of 1.26. Culture ranges from 0 to 10 with a mean of 4.95, a standard deviation of 1.95.

As a benchmark, we first show the basic relationship between economic growth and initial economic freedom, culture, and the culture/freedom interaction term. We report the results of the direct effects from culture and economic freedom in order to verify the results found in the previous literature. However, we drop this analysis in subsequent specifications and focus only on the interaction term. In order to provide a more robust model specification, we include our control variables in two stages. We first control only for investment share of GDP and population growth, then we add percent urban population and log of the area for the complete specification.

Our fixed effects model specification can be identified as:

$$G_{it} = \mu_i + \beta M_{it} + \varepsilon_{it}$$

where G equals the growth rate, and M represents the different combinations of our main variables. Initial income and country dummies are included in all regressions.¹²

The benchmark and main fixed effects regressions are shown in Table 2.

Column (1) shows that, independently, economic freedom has a positive and highly significant direct association with economic growth. A one unit increase in initial economic freedom (going from Poland to India) increases the growth

12. Since the culture index does not vary much over time, we do not control for year dummies, as this would potentially eliminate any possible impact from culture.

Table 2

Economic Freedom, Culture, and Growth

Panel Fixed Effects Regressions						
	Depend. Var: Growth Rate					
	(1)	(2)	(3)	(4)	(5)	(6)
Initial econ freedom	1.26*** (0.33)	1.23*** (0.33)	0.87** (0.38)	1.22 (0.577)	- 0.17 (0.58)	- 0.32 (0.59)
Culture		0.38 (0.26)		- 1.30* (0.77)	- 1.57** (0.76)	- 1.61** (0.76)
Cult*econ freedom			0.09** (0.04)	0.13*** (0.04)	0.31*** (0.12)	0.32*** (0.12)
Invest/GDP					0.21** (0.08)	0.21** (0.08)
Pop. Growth					- 0.57 (0.73)	- 0.25 (0.77)
Urban pop. %						0.15 (0.10)
Area (log)						190 (365)
Initial gdppc (log)	- 4.21*** (1.11)	- 4.35*** (1.11)	- 4.55*** (1.10)	- 4.82*** (1.10)	- 5.56*** (1.12)	- 6.78*** (1.42)
Constant	33.91*** (9.17)	33.52*** (9.13)	36.68*** (9.11)	44.15*** (10.06)	49.60*** (10.18)	- 2,380 (4,673)
Observations	180	180	180	180	180	178
Number of countries	74	74	74	74	74	72
Adj. R-squared	0.18	0.20	0.19	0.21	0.26	0.27

Note: Robust standard errors are in parentheses. Significance level: ***at 1%, **at 5%, *at 10%.

rate by 1.26 percentage points, a substantial increase when compared to the average growth rate. If a country improves from the lowest economic freedom score to the highest, it would experience an increase in growth by 6.49 percentage points. This result supports previous work on the direct link between freedom and growth (for example, see Weede and Kämpf 2002 and De Haan et al. 2006). Column (2) reports the result controlling for both economic freedom and culture. Economic freedom is positive and significant, while culture's effect is insignificant, supporting the results presented in Williamson and Mathers (2010).

In order to understand how culture enhances or diminishes the productivity of economic freedom, Column (3) presents a reduced form of the model to decipher how culture contributes to the productivity of capitalism. In this regression, both initial freedom and the interaction term are positive and significant and explain 19 percent of the growth variation (including initial income). If initial freedom increases by one standard deviation, growth increases by 1.10 percentage points. This result also suggests that the impact from economic freedom on growth is enhanced by the presence of strong

cultural constraints. A one standard deviation increase in the interaction term (for example, going from Rwanda to India) increases growth by approximately 1.49 percentage points (over 40 percent of the average growth rate).¹³ Regression (4) now includes culture as well as initial freedom and the interaction term. The coefficient on the interaction terms increases in size and significance, suggesting that a one standard deviation increase would increase the growth rate by 2.14 percentage points, over 65 percent of the average growth in our sample. Economic freedom loses its significance, and culture enters the regression as negative and significant; however, as mentioned previously, we do not place a strong interpretation on these two coefficients because of the high correlation between all three variables. We focus mainly on the sign and significance of the interaction term throughout the remainder of the paper.

Regressions (5) and (6) introduce our control variables to the model. The coefficient from the interaction term remains significant and increases in size. This result suggests that a move from Venezuela to Ireland increases the growth rate by over 5 percentage points, over 1.5 times our sample's average growth rate. Economic freedom and culture remain as before. As we would expect, investment to GDP positively and significantly impacts economic growth in both regressions. Population growth is negative but always insignificant. Both urban population and log of area is positive but insignificant. Overall, the additional control variables only add minimal explanatory power to the model.

In addition to supporting previous work, these results begin to highlight an important role for the interaction between culture and freedom and its relationship to growth. To understand the additional explanatory power from culture's interaction with freedom, we take the ratio of the two coefficients (initial freedom and the interaction term) and find that culture enhances freedom's impact on growth by approximately 10 percentage points (from regressions 3 and 4). These results suggest that countries with informal institutions in line with the economic institutions captured by the freedom index will experience a higher rate of return from such institutions.¹⁴ In other words, it is the 'informal glue' that contributes to creating binding constraints, enhancing the overall effectiveness of economic institutions.

While these results are consistent, we recognize potential concerns, such as endogeneity and omitted variable bias, and engage in a variety of robustness checks.

13. Initial income is always negative and significant, as expected, in this Table and in the subsequent analysis.
14. This problem highlights a concern raised in previous studies (Gwartney et al. 1999) where successful change in economic institutions requires a credible commitment from the government. For an investigation analyzing credible commitment problems with reconstruction efforts, see Coyne and Boettke (2009).

V. SENSITIVITY ANALYSIS

5.1 Subsamples

Our first robustness check attempts to control for endogeneity by rerunning our main regressions using subsamples from our main dataset. We run two basic regressions on two different subsamples created by splitting our dataset based on income or economic freedom. The first subsample splits the sample of countries into two—one group includes those countries with an average annual GDP pc below \$10,000, and the second group includes countries above the \$10,000 threshold. This splits our country sample into two categories loosely defined as developed (high income or middle income) or underdeveloped (low income). This subsample provides us with a unique perspective of how freedom and the interaction between freedom and culture affect economic performance across countries at different levels of development.

In the second subsample, we split our sample of countries again into two groups: 1) the economically free countries with an index greater or equal to five and 2) the economically unfree countries with an index less than five. We choose this benchmark because this splits the index in half. We can now analyze if there is a difference in the interaction between culture and freedom among those countries that are already free or those that are unfree. We control for initial freedom, culture, the interaction term, investment/GDP, and population growth in the first subsample. In the second subsample, we control for initial income rather than initial freedom.

Columns (1) - (4) in Table 3 report the results of the income subsample. In both income groups, initial freedom is negative, but only significant in the higher-income group.¹⁵ The interaction term is always positive and significant, but has more than twice the effect on growth in the low-income group. This result highlights an important and critical role for culture in enhancing the productivity of economic freedom, especially in the low-income subsample.¹⁶

The results from the second subsample, based on the freedom index, are presented in columns (5)-(8) in Table 3 above. In all four regressions, the interaction term is positive and significant. However, the coefficient on

15. This is likely due to the fact that high-income countries already have high levels of economic freedom.

16. Another interesting result from these regressions show that population growth has a positive and significant effect on growth in our countries below \$10,000 GDP pc. Also, investment is insignificant in the underdeveloped countries while positive and significant in the developed subsample. Culture is negative and significant in all four regressions.

Table 3
Economic Freedom, Culture, and Growth

	Dependent Var: Growth Rate							
	Group 1: <10,000 GDPPC (1)	Group 2: >10,000 GDPPC (2)	Group 3: >10,000 GDPPC (3)	Group 4: >10,000 GDPPC (4)	Group 5: Free (Index >5) (5)	Group 6: Unfree (Index <5) (6)	Group 7: Unfree (Index <5) (7)	Group 8: Unfree (Index <5) (8)
Initial econ freedom	-1.51 (1.41)	-1.76 (1.38)	-1.82* (0.92)	-2.26** (0.91)	-0.77 (0.51)	-0.80 (0.51)	-7.05* (3.08)	-8.08** (2.74)
Culture	-3.54* (1.86)	-4.74** (1.93)	-2.88** (1.38)	-3.34** (1.35)	0.17*** (0.06)	0.17*** (0.06)	1.35** (0.44)	1.78*** (0.45)
Cult* econ freedom	0.81** (0.36)	1.06*** (0.39)	0.42** (0.18)	0.48*** (0.17)	0.17*** (0.11*)	0.17*** (0.07)	0.17*** (0.07)	0.17*** (0.07)
Invest/GDP		0.05		0.21**				
Pop. growth		-0.2 3.50*		(0.08) -1.25 (0.94)				
Initial gdpce (log)		-1.9						
Constant	8.78 -7.18	4.35 -7.78	14.87** (7.15)	14.18** (7.00)	-2.90*** (0.78)	-3.34*** (0.84)	-2.30*** (0.67)	-29.67** (9.83)
Observations	85	84	97	97	28.47*** (7.35)	30.48*** (7.70)	21.98*** (5.65)	246** (82)
Number of countries	43	43	36	36	64	146	35	35
Adj. R-squared	0.21	0.24	0.03	0.03	0.23	0.32	0.26	0.30

Note: Robust standard errors are in parentheses. Significance level: *** at 1%, ** at 5%, * at 10%.

the interaction term among the unfree countries is 9 times larger than in the free countries (the difference between Ghana and Spain), suggesting that culture's ability to enhance economic institutions is stronger when freedom is weak or when countries are first transitioning to economic freedom, supporting our theory above.

5.2 *Additional Controls*

Another robustness check tests for omitted variable bias by including three additional control variables. The control vector now includes a measure of educational attainment, a geography component, and legal origin. We did not include these measures previously due to the high correlations with our main variables, with other controls, or because including them reduces the number of observations significantly.

We include the effect of education rates by using primary education measured as the number of pupils enrolled in primary school. The positive link between education and development and growth is well documented (Mankiw et al. 1992; Barro 2002). Our second additional control is latitude, or distance from the equator, as our geography measure. Diamond (1997), Gallup et al. (1999), and Sachs (2001, 2003) argue that geography has a direct impact on economic growth due to climate, the disease environment, endowment of resources, and transactions costs.

Our last control variable is legal origin, capturing the effects of common versus civil law. Legal origin is shown to shape financial, legal, and economic institutions and outcomes (Djankov et al. 2003). Common law, imposed during British colonization, is referred to as English legal origin, and civil law, imposed by French colonizers, is French legal origin. We control for the effect of past legal institutions by including legal origin as dummy variables representing English and French origin.

Table 4 presents regressions with the three additional controls. In all regressions, we include initial income, initial freedom, culture, the interaction term, and all previous control variables. We do so to provide the most difficult case for significance of the interaction term. In all three specifications, the interaction term is positive and significant with an average coefficient of 0.38. This suggests that a one standard deviation increase would lead to an approximately 6 percentage point increase in the growth rate. In column (1), education positively and significantly impacts economic growth, as expected. When controlling for geography, latitude is positive and significant. Legal origin is insignificant. It is also worth noting that the inclusion of education significantly increases the R-squares, whereas geography and legal origin only marginally explain additional growth variations.

Table 4

Economic Freedom, Culture, and Growth

Panel Fixed Effects Regressions With Additional Controls			
	Dependent Var: Growth Rate		
	(1)	(2)	(3)
Initial econ freedom	0.38 (0.64)	- 0.46 (0.62)	- 0.39 (0.65)
Culture	- 3.05** (0.97)	- 1.78** (0.78)	- 1.62* (0.82)
Cult*econ freedom	0.46** (0.14)	0.35** (0.12)	0.32** (0.13)
Primary sch. enrollment	5.00** (2.00)		
Geography		1.99* (1.10)	
English legal origin			0.23 (0.58)
French legal origin			- 0.27 (0.58)
Invest/GDP	0.21** (0.09)	0.17* (0.08)	0.17* (0.09)
Pop. Growth	- 1.02 (0.85)	- 0.11 (0.78)	- 0.27 (0.80)
Urban pop. %	- 0.06 (0.16)	0.27** (0.11)	0.26** (0.11)
Area (log)	- 1,602.43 (1098.62)	371.37 (362.86)	405.45 (371.14)
Initial gdppc (log)	- 8.10*** (1.72)	- 7.90*** (1.47)	- 7.85*** (1.51)
Constant	20,959.02 (14319.39)	- 4,687.36 (4632.97)	- 5,122.57 (4738.70)
Observations	48	165	165
Number of countries	26	72	72
Adj. R-squared	0.93	0.33	0.32

Note: Robust standard errors are in parentheses. Significance level: ***at 1%, **at 5%, *at 10%.

5.3 What About Levels?

Our last robustness check replaces economic growth with the level of development, measured by GDP per capita (PPP) as the dependent variable.

A similar result emerges, as shown in Table 5. Economic freedom positively and significantly affects the level of development in three out of six regressions. Culture is positive and significant in absence of the interaction term and negative and significant once it is included. The interaction term is positive and highly significant. Investment ratio to GDP is positive and significant. Both population growth and urban population are positive and significant in column (7). The high R-squareds suggest that the model specifications explain a significant portion of the variation in levels of development across countries.

Table 5

Economic Freedom, Culture, and Growth

Panel Fixed Effects Regressions - Level of Development

	Depend. Var: Log GDP per capita (PPP)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Initial econ freedom	0.21*** (0.03)		0.21*** (0.03)	0.16*** (0.03)	0.06 (0.06)	-0.01 (0.06)	-0.07 (0.04)
Culture		0.06** (0.3)	0.05** (0.02)		-0.17** (0.07)	-0.20** (0.07)	-0.16** (0.05)
Cult*econ freedom				0.01*** (0.003)	0.03** (0.01)	0.04*** (0.01)	0.04*** (0.01)
Invest/GDP						0.02** (0.01)	0.02** (0.01)
Pop. Growth						-0.03 (0.07)	0.11* (0.06)
Urban pop. %							0.05*** (0.01)
Area (log)							-2.81 (27.29)
Constant	7.84*** (0.18)	8.85*** (0.14)	7.64*** (0.20)	7.83*** (0.17)	8.54*** (0.35)	8.43*** (0.35)	41.47 (348.70)
Observations	185	185	85	185	185	182	180
Number of countries	75	75	75	75	75	74	72
Adj. R-squared	0.47	0.37	0.54	0.55	0.41	0.49	0.69

Note: Robust standard errors are in parentheses. Significance level: ***at 1%, **at 5%, *at 10%.

VI. CONCLUSION

We are now able to answer the question that began this analysis— does capitalism perform better when embedded in certain cultures? Our results undoubtedly indicate yes. Measures of economic freedom independently, positively, and significantly impact economic growth. Our analysis extends this line of investigation, providing an empirical test of the impact of the interaction between economic freedom and culture, indicating that such interaction does demonstrate a significant and positive effect on economic growth.

These results suggest that the same economic institutions can be in place in different cultures and have diverse results. As Pejovich (2003, p. 347) explains, 'It's the culture, stupid.' Though certain cultures may diminish the productivity of capitalism, we want to emphasize that we are not advocating that countries should resist pro-market reform. Our results support the strong relationship between capitalism and economic growth. If informal institutions are lacking, economic freedom alone may not possess the necessary binding constraints to be as effective as theory predicts. Capitalism may be more productive in

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countries with cultures more compatible with capitalistic values, meaning that we get ‘more bang for the buck.’ We view our analysis as providing an explanation as to why some economic reforms may not always provide the panacea of results that are predicted, suggesting strong implications for policy recommendations and reform in both developing and developed countries.

Appendix 1

Variable	Data Description	Data Source
GDP Growth	Growth of GDP per capita, PPP basis, constant 2000 international dollars.	World Development Indicators 2006
Economic Freedom	Economic freedom of the World is compiled by the Fraser Institute and measures the level of economic freedom on a scale from zero to ten, with ten representing a greater degree of freedom. The index utilizes 21 components grouped in seven broad categories: size of government, economic structure and use of markets, monetary policy and price stability, freedom to use alternative currencies, legal structure and security of security of private ownership, freedom to trade with foreigners, and freedom of exchange in capital markets. The index is available from 1970 onwards, based on 5 year intervals from 1970 to 2000; after 2000 it is reported on an annual basis.	Fraser Institute, <i>Economic Freedom on the World</i>
Culture	The sum of three positive beliefs (control, respect, trust) minus the negative belief (obedience). Trust is measured as the percentage of respondents who answered that ‘Most people can be trusted,’ respect is measured as the percentage of respondents that mentioned the quality ‘tolerance and respect for other people’ as being important, control is measured as the unconditional average response (multiplied by 10) to the question asking to indicate how much freedom of choice and control in your life you have over the way your life turns out (scaled from 1 to 10), obedience is the percentage of respondents that mentioned obedience as being important. PCA culture is constructed by using principle component analysis to extract the common variation among all four components. Both indices are normalized to range between 0 and 10.	World Values Surveys, 1981–2007
GDP pc (log)	Real GDP per capita in 2000 constant dollars, log form.	Penn World Tables version 6.2

Appendix 1. (Contd)

Variable	Data Description	Data Source
Investment share of GDP	Ratio of total investment to GDP in 2000 constant dollars.	Penn World Tables version 6.2
Log Area	Logarithm of total area of a country.	World Development Indicators 2006
Population Growth	Growth rate of population.	World Development Indicators 2006
Urban Population	Percentage of population living in an urban area.	World Development Indicators 2006
Primary School Enrollment	Total number of pupils enrolled in primary school.	World Development Indicators 2006
Geography	Measured as the absolute value of the latitude of the country, scaled to values between 0 and 1 (0 is the equator)	La Porta et al. 1999
Legal Origin	Dummy variables representing English or French legal origins.	La Porta et al. 1999

Appendix 2
Pairwise Correlations

	Growth	Cult.	Initial econ free	Cult*econ free	Initial gdppc	Invest/ GDP	Pop growth	Urb. pop	Area (log)	Prim. sch.	Geo.	English	French
Growth	1.00												
Culture	-0.07	1.00											
Initial econ freedom	0.07	0.52	1.00										
Culture*freedom	-0.04	0.94	0.75	1.00									
Initial gdppc (log)	-0.31	0.61	0.67	0.70	1.00								
Invest/GDP	0.09	0.54	0.50	0.57	0.57	1.00							
Pop growth	0.31	-0.33	-0.06	-0.27	-0.50	-0.30	1.00						
Urban pop %	-0.24	0.34	0.44	0.41	0.73	0.31	-0.28	1.00					
Area (log)	0.06	0.05	-0.06	0.02	-0.17	-0.14	0.30	-0.11	1.00				
Primary school rate	0.05	0.64	0.70	0.73	0.78	0.34	0.07	0.30	0.01	1.00			
Geography	0.17	-0.02	0.04	-0.02	-0.03	0.08	0.06	0.00	0.02	-0.22	1.00		
English legal origin	-0.02	-0.16	-0.02	-0.12	-0.01	-0.09	0.02	0.03	0.09	0.06	-0.27	1.00	
French legal origin	-0.10	0.19	-0.04	0.14	0.05	0.07	-0.08	0.01	-0.09	-0.04	-0.27	-0.67	1.00

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SUMMARY

Does capitalism perform better when embedded in certain cultures? Given the wide range of economic outcomes, we address potential causes for the effectiveness or ineffectiveness of institutional constraints. This paper argues that culture matters for the success of capitalist institutions, specifically economic freedom. We claim that different cultures may raise or lower the productivity of economic institutions by either constraining or supporting these rules. We analyze this relationship empirically by examining how the interaction between economic freedom and culture affects economic growth. Our results suggest that culture does, indeed, enhance the effectiveness of capitalism and its subsequent impact on growth.

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