WORKING PAPER

ECONOMIC FREEDOM, CULTURE, AND GROWTH

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Abstract

How do economic freedom and culture impact economic growth? This paper argues that culture and economic institutions, specifically economic freedom, both play a role in economic development independently, but the strength of their impact can only be better understood when both are included in the growth regression. We find that, when both are included in the growth regression, the impact of culture is greatly diminished, while economic freedom continues to have a significant impact on economic growth. Our results suggest that economic freedom is more important than culture for growth outcomes, though the mechanisms through which culture affects growth warrant further investigation. We posit that culture may be more important for initial growth, diminishing in significance once the institutions of economic freedom have been established.

JEL Codes: O43, P50, Z1

Keywords: culture, informal institutions, economic freedom, economic growth

I. Introduction

Economic institutions such as private property, rule of law, and contract enforcement are extremely important for economic growth and development. As defined by North (1990, 1991), 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 (see Boettke and Coyne 2009). Economists independently link both formal and informal institutions to growth, but the relative effects of the two remain to be seen. Following this logic, we argue that both economic institutions and culture need to be accounted for when analyzing economic growth.

Our analysis is unique in that we include measures of culture *and* measures of economic institutions in our growth equation. To measure economic institutions, we rely on the widely used Economic Freedom of the World Index compiled by the Fraser Institute. To capture culture, we focus on cultural attributes that are relevant for economic exchange. This "economic culture" is measured by a culture index created from the World Values Surveys capturing the level of trust, respect, self-determination, and obedience in order to generate an overall culture index (Tabellini 2008, 2009; C. Williamson and Kerekes 2009). By controlling for both economic institutions and economic culture, we parcel out the relative effects of each on economic outcomes, thus providing insight into how both culture and freedom affect growth.[1]

Our contribution lies at an intersection between the economic growth-economic freedom literature and the literature examining how culture matters for economic

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[1]Each of these measures is discussed in greater detail below.

performance. More generally, the analysis can be viewed as a contribution to the literature attempting to understand how institutions matter for economic development. The main goal of the study is to incorporate "cultural capital" into the economic freedom-economic growth framework. We also expand on the previously established economic freedom-economic growth relationship (for example, Dawson 1998, 2003; Gwartney, et al. 1999; Heckelman 2000; Gwartney, et al. 2004), and we contribute to a new discussion on the direct association between economic growth and culture (for example Guiso, et al. 2006; Licht, et al. 2007; Tabellini 2008, 2009).

To achieve these goals, we create a panel dataset spanning from 1970 to 2004, using five-year averages to minimize short-term business cycle fluctuations and measurement error. This creates seven time periods across 141 countries. Our dependent variable is the growth rate, and our main independent variables are our measures of economic institutions and culture. Our investigation employs a variety of empirical techniques including ordinary least squares (OLS) and fixed effects with a variety of different control variables. In addition, we provide several sensitivity checks to our model by attempting to control for endogeneity and reverse causality and testing for omitted variable bias.

Our results suggest that, independently, both culture and economic freedom contribute to economic prosperity. However, once we control for both culture and economic freedom simultaneously, the strong association between culture and growth becomes much weaker, while, overwhelming, economic freedom retains a positive and highly significant relationship with economic growth. These results suggest that culture

may be important for economic growth, but economic institutions that support private property and rule of law are the foundation for a country's successful economic growth.

This paper proceeds as follows. Section II describes conceptually the relationships between economic freedom, culture, and economic growth. Section III explains how the economic freedom and culture variables are measured and offers hypotheses concerning the effect of these variables on growth. The control variables are also explained in this section. Section IV applies empirical techniques to the hypotheses outlined in section III. Section V tests the robustness of the results, and section VI offers conclusions and policy implications.

II. Conceptual Link to Growth

In order to understand how culture may affect economic growth, we must first specify what we mean by culture. We follow Guiso, et al. (2006: 23), who characterize culture as ". . . those customary beliefs and values that ethnic, religious, and social groups transmit fairly unchanged from generation to generation." Starting from this general definition, we focus on several specific indicators of culture that are identified as being relevant for economic interaction and exchange. Therefore, one can think of this subset as "economic culture." Porter (2000) defines economic culture as "the beliefs, attitudes, and values that bear on economic activities of individuals, organizations, and other institutions" (p. 14). We follow Porter's terminology in order to narrow the concept of culture so that we can focus our analysis on how economic cultural traits may affect economic growth. This narrowing process enables us to provide a more in-depth analysis of the connection between culture and economic growth (Kessing 1987; Patterson 2000).

Our economic culture variable is constructed by identifying four distinct categories of culture that should constrain behavior related to social and economic interaction and, thus, economic development. These four components are trust, respect, individual self-determination, and obedience and serve as rules governing interaction between individuals, including market production and entrepreneurship. In general, 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.[2]

How might this conception of economic culture impact growth? As Boettke (2009: 437) states, "culture is both a binding and bending constraint on human affairs." Our first component of culture, trust, may influence economic outcomes through its impact on transaction costs. When individuals are more trusting, transactions costs and monitoring costs are lower, and property rights are more secure (C. Williamson and Kerekes 2008). This literature asserts that greater levels of trust are consistent with greater economic growth and development (Fukuyama 1996; Knack and Keefer 1997; La Porta, et al. 1997; Woolcock 1998; Zak and Knack 2001; Francois and Zabojnik 2005). As Coyne and C. Williamson (2009) explain, low levels of trust lead to smaller trading networks between individuals due to high transactions and monitoring costs. Because of this effect, the extent of the market is much smaller than it would be if trust levels were elevated, making anonymous trade a more attractive option given the lower monitoring and transactions costs.

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[2] Baumol (1990) suggests that under good institutional environments, individuals devote their time to developing their talents and engage in productive entrepreneurship; however, under poor institutions, individuals face different incentives and engage in unproductive entrepreneurship. Sobel (2008) empirically verifies this relationship between institutional quality and entrepreneurship.

The second cultural measure, self-determination, is a quantitative measure of the amount of control individuals feel they have in determining their actions. In other words, do individuals have control over their choices? If the answer to this is yes, and individuals must claim the results of their actions—whether they be good or bad outcomes—individuals will be more likely to innovate, invest in the future, and work more diligently (Tabellini 2009; Coyne and Williamson 2009). Put another way, 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 third cultural measure, respect, is important in that a greater level of respect connotes a greater tolerance for others. With greater tolerance comes a more accepting attitude towards trade with outsiders, thus increasing the extent of the market and increasing economic growth and development. Respect is, at its core, a measure of generalized versus limited morality, where generalized morality implies morality both within and between groups based on abstract rules governing behavior. Limited morality implies behavior within groups based on rules but lacks general principles to govern interaction between groups. Thus, economic interaction and exchange can be hindered by a lack of generalized morality. 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 (Platteau 2000). As Coyne and Williamson (2009: 13) explain, "in societies with lower levels of social capital, and

hence lower levels of respect, the extent of the market will be limited to close kin and friendship networks." According to this line of reasoning, higher levels of respect should lead to higher levels of economic development.

Finally, the fourth cultural measure, obedience, may affect economic growth in a negative manner. If children are taught to be obedient and individualism is frowned upon, children may have lower levels of control and autonomy and, thus, be less likely to engage in the risk-taking essential for entrepreneurship (Harper 2003). Societies exist in which individualism is viewed as potentially damaging (Tabellini 2009). Due to the negative impact of high levels of obedience on individual autonomy and risk-taking, the existing literature suggests that high levels of obedience will negatively impact economic development and result in less economic interaction than that present in societies where autonomy and individualism are valued more than obedience. Overall, trust, self-determination, and respect all lend support to economic growth, while obedience lowers the prospects of economic prosperity.

The inclusion of culture in both theoretical and empirical economic studies is a recent development (see, for example, Boettke 2009; Boettke and Coyne 2009; Boettke, Coyne, and Leeson 2008; Pejovich 2003).[3] Culture, especially in economic growth literature, is largely ignored or assumed away as a constant. However, as Boettke (2009: 436) aptly states, "We cannot assume away cultural influences as economists have often done." After all, as Srauss and Cropsey (1987: 556) state, "That foundation of

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[3] 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 (Barro 1996; Acemoglu et al. 2001, 2002; Easterly 2001; Rodrik et al. 2004; Acemoglu and Johnson 2005; Mehlum et al. 2006). The relationship between formal and informal institutions and economic development is empirically analyzed in C. Williamson (2009).

government truly in accordance with men's natural inclinations is not contract but custom." Empirically, several studies lend credence to the hypothesis that informal rules and culture play a role in economic outcomes (Chamlee-Wright 1997; Knack and Keefer 1997; Grier 1997; Duffy and Stubben 1998; Barro and McCleary 2003; Guiso, et al. 2006; Leeson 2007a,b,c; Licht, et al. 2007; C. Williamson 2009). In fact, Tabellini (2009) finds a strong causal relationship between culture and economic development across different European countries. C. Williamson and Kerekes (2008) empirically demonstrate that culture can lead to more secure private property rights. Additionally, Grief (1994), Banfield (1958), and Putnam (1993) conclude that cultural concerns and beliefs must be considered when devising strategies for economic development if these policies are to be successful and self-sustaining.

In addition to explaining how culture may impact growth, we also examine how economic freedom affects economic performance, a query that is robustly discussed in previous literature. The theoretical underpinning regarding the link between economic freedom and economic growth is well established. As De Haan and Sturm (2000: 3) note, "since the time of Adam Smith, if not before, economists and economic historians have argued that the freedom to choose and supply resources, competition in business, trade with others and secure property rights are central ingredients for economic progress."

Economic freedom, in its most compact definition, refers to the protection of private property rights and the freedom of voluntary transactions (Gwartney, et al. 1996). A government that does not enforce contracts, usurps property from its citizens without due compensation, and puts limits on voluntary transactions violates the tenets of

economic freedom. In so doing, such a government provides a disincentive for entrepreneurship and productivity, given that individuals are skeptical about realizing the gains of their productive efforts. It is the lure of the individual's potential gain from productive activities and new ideas that makes entrepreneurship, and thus growth, possible.[4]

Within the growth literature, there have been many efforts to assess the impact of economic freedom on growth and development. Noting that protection of private property and freedom of choice and exchange are the key elements of economic freedom, De Haan, et al. (2006) examine the existing empirical research and conclude that a vast majority of studies support the positive link between economic freedom and growth.[5] For example, Gwartney, Lawson, and Block (1996), the creators of the Fraser Institute's measure of economic freedom, note that the countries with the highest economic freedom scores have an average annual growth rate of per capita real GDP of 2.4 percent, while those with the lowest economic freedom scores have an average of negative 1.3 percent for 1980–94. The authors also iterate that countries significantly improving their economic freedom scores recorded positive rates of growth.

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[4] In addition to the general definition offered above, recall that economic freedom can be thought of as a collection of various subheadings, including size of government, economic structure and use of markets, monetary policy and price stability, freedom to use alternative currencies, legal structure and security of private ownership, international exchange and freedom to trade with foreigners, and freedom of exchange in capital markets (Carlsson and Lundström 2002). Each of these categories represents a smaller facet of the overarching definition of economic freedom.

[5] For example, De Vanssay and Spindler 1994; Gwartney, Lawson, and Block 1996; Islam 1996; Hanke and Walters 1997; Goldsmith 1997; Easton and Walker 1997; Park and Ginarte 1997; De Haan and Siermann 1998; Farr et al. 1998; Grubel 1998; Johnson and Lenartowicz 1998; Ayal and Karras 1998; Dawson 1998; Nelson and Singh 1998; Gwartney et al. 1999; Leschke 2000; De Haan and Sturm 2000; Heckelman and Stroup 2000; Sturm and De Haan 2001; Carlsson and Lundström 2002; Leertouwer et al. 2002; Green et al. 2002; Ali and Crain 2002; Weede and Kämpf 2002; Knowles and Garces-Ozanne 2003; Paldam et al. 2003; Bengoa and Sanches-Robles 2003; Norton 2003; Cole 2004; Gwartney et al. 2004; World Bank 2004; Heckleman and Knack 2004; De Haan and Sturm 2004; Berggren and Jordahl 2005; Doucouliagos and Ulubasoglu 2006; Weede 2006.

Given the existing literature illustrating the importance of culture and economic freedom, independently, on growth, the next logical question is how economic growth is impacted by both variables. When culture and economic freedom are included in empirical estimates, the relative impact of each on growth can be deduced. In the next section, we begin this endeavor by describing the variables used in our analysis and the potential outcomes of our regressions.

III. Data and Hypotheses

In this section, we discuss the measurements used for economic freedom and culture in more detail and formulate hypotheses regarding the freedom-growth relationship, the impact of culture on economic growth, and the effects of controlling for both economic freedom and culture on economic growth. Also included is a summary of the controls used in our growth regressions and the rationale behind their inclusion.

3.1 Culture

To measure culture, we utilize data from the World Values Surveys to quantify trust, self-determination, respect, and obedience. These surveys capture individual beliefs and values reflecting local norms and customs, i.e. culture (The EVS Foundation and the WVS Association 2006). 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 utilized and 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 those surveyed who chose "tolerance and respect for other people" is used to measure respect. The same question is used to measure obedience, but in this case, the percentage of those surveyed who 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. Since we are concerned with the impact of overall economic culture, this aggregate variable serves as the main focus of our empirical analysis. In order to maximize our number of periods for the panel data, the

culture variable is constructed as follows.[6] 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.

Culture and Economic Growth

With the potential impact of these four measures captured in our culture variable, we

arrive at the following hypotheses:

> *Hypothesis 1a:* Culture has a positive impact on economic growth in societies with high levels of trust, respect, and self-determination and low levels of obedience.

> *Hypothesis 1b:* Culture has a negative impact on economic growth in societies with low levels of trust, respect, and self-determination and high levels of obedience.

3.2 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, utilizing 21 different components, on

a scale from zero to ten, with ten representing a greater degree of freedom. These

components can be 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 private ownership, freedom to trade

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[6] The 7 time periods are 1974 (average 1970–1974), 1979 (average 1975–1979), 1984 (average 1980–1984), 1989 (average 1985–1989), 1994 (average 1990–1994), 1999 (average 1995–1999), and 2004 (average 2000–2004).

with foreigners, and freedom to exchange in capital markets. According to this index, economic freedom measures "the extent to which rightly acquired property is protected and individuals are free to engage in voluntary transactions" (De Haan and Sturm 1999: 3). Thus, any government interference in transactions decreases the economic freedom score for that country.[7]

Economic Freedom and Growth

Even though the existing literature overwhelmingly supports the theory that economic freedom displays a significantly positive effect on economic growth (as discussed above), there are a small number of studies yielding insignificant (or even negative) effects of select categories of economic freedom on growth (Ayal and Karras 1998). For example, Sala-i-Martin (1997) concludes that both the freedom to use alternative currencies and freedom to trade with foreigners have an insignificant effect on growth. However, it is important to note that even the studies with atypical results generally only report insignificant or negatively significant results for a particular category, noting positively significant results overall.[8] Given the large body of existing evidence regarding the effect of economic freedom on economic growth, we offer the following hypothesis and alternative hypothesis:

Hypothesis 2a: Economic freedom increases economic growth.

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[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 1999.

[8] Carlsson and Lundström (2002) provide a tabular summary of research in the various categories of economic freedom, observing positive results for the effect of economic freedom on economic growth for categories including, but not limited to, freedom to use alternative currencies (Ayal and Karras 1998), legal structure and security of private ownership (Knack and Keefer 1995), freedom to trade with foreigners (Torstensson 1994), and freedom of exchange in capital markets (Ayal and Karras 1998).

Hypothesis 2b: Economic freedom does not increase economic growth.

3.3 Economic Freedom, Culture, and Economic Growth

Once controlling for both freedom and culture in the same growth regression, we will be able to analyze the relative effects of these two variables, offering evidence as to which has more importance in determining economic outcomes. Thus, we offer the following hypotheses:

> *Hypothesis 3a:* Both culture and economic freedom increase economic growth.
>
> *Hypothesis 3b:* Neither culture nor economic freedom increase economic growth.
>
> *Hypothesis 3c:* Either culture or economic freedom increases economic growth.

3.4 Control Variables

In addition to economic freedom and culture, 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 in selecting our variables (for example, Levine and Renelt 1992; Dawson 1998; Gwartney, et al. 2004). Our standard control vector includes initial real Gross Domestic Product (GDP) per capita in 2000 constant dollars (log form) as a conditioning variable, the investment share of real GDP (2000 constant dollars), and the population growth rate.[9] Initial GDP per capita and investment share of GDP are taken

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[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 culture (see Appendix 4).

from Penn World Tables version 6.2 (Heston, et al. 2006). Population growth is collected from World Development Indicators 2006.

Population growth is included to control for potential effects from changes in country size. The overall predicted effect of population growth is ambiguous. A rapidly expanding population may be harmful to economic growth due to higher transactions costs, the potential for increased conflict as individuals compete for scarce resources, and higher costs of monitoring individual behavior. Population growth can also be good for economic growth. With more individuals comes the greater probability of advances in technology, innovation, and entrepreneurship (Bauer 2000).

We include the investment share as one of our standard control variables because of the well-documented positive relationship between the rate of investment in physical capital and the rate of growth (Levine and Renelt 1992). However, we acknowledge a potential endogeneity problem, as highlighted by De Haan, et al. (2006), of including both economic freedom and the investment rate in the same regression. Several studies show that economic freedom influences growth directly through a productivity enhancing channel and indirectly through an investment effect (Dawson 1998; Bengoa and Sanches-Robles 2003; Gwartney, et al. 2004). We address this concern in the following section.

In addition to the standard control vector, we also utilize a more general control vector, as suggested by the existing development literature, which includes urban population, the rate of inflation, the size of government, and country size. We use the log of the total area of a country to control for its size. Urban population is measured by the percentage of the population living in an urbanized area. The rate of inflation is included to control for macroeconomic policy shocks to the economy (Acemoglu, Johnson, and

Robinson 2001, 2002). The size of government is measured as government's share of real GDP and is included to control for the potential negative effect of a large government on economic growth. Urban population, area, and the inflation rate are taken from World Development Indicators 2006, and government share of GDP is collected from Penn World Tables version 6.2. Appendix 1 provides a summary description of all data used in the analysis along with their sources.

IV. Empirical Analysis and Results

This section explores our empirical strategy and results. We implement panel analysis from 1970 to 2004 using five-year averages. We first provide a benchmark specification using OLS estimation to provide a baseline and a point of comparison with previous studies. We then turn to our main model specification, where we run fixed effects (with robust standard errors), univariate and bivariate regressions, and regressions with a combination of our main variables and our control vectors.

Throughout the analysis, we undertake a variety of regression specifications in order to follow the pre-existing literature, provide robustness, and minimize endogeneity concerns discussed above. This includes controlling for initial economic freedom (the freedom score at the beginning of the period) and changes in economic freedom (the difference from the previous period) separately as well as jointly to comply with specifications in the current literature (for a theoretical discussion involving the 'correct' model specification, see De Haan, et al. 2006 and Lawson 2006). We then add the standard control vector and the general control vector to these different regression specifications. We report all results controlling for initial income level.

4.1 Panel Benchmark Specification

Appendix 2 lists all countries used in the analysis as well as their average (from 1970–2004) score and rank for the culture index, economic freedom index, and growth rate. Summary statistics for all variables used in the panel analysis are provided in appendix 3. We use panel data with 141 countries, spanning from 1970 to 2004 (creating seven points in time with five-year averages), with an average growth rate of 3.54 and a standard deviation of 3.11.[10] Initial economic freedom has a minimum score of 2.10 (Nicaragua 1989) and a maximum of 9.23 (Hong Kong 1984), with a mean of 5.79 and a standard deviation of 1.28. Changes in economic freedom range from -2.22 to 2.31, with a mean of 0.20 and a standard deviation of 0.65. Culture spans from 1984–2004 (five time periods), ranging from 0 to 10 with a mean of 4.82 and a standard deviation of 1.82.

As mentioned above, we recognize that many of our variables of interest and our control variables are correlated with one another (see appendix 4 for a pairwise correlation matrix). For example, culture is correlated with initial economic freedom (0.52), investment (0.54), and initial GDP pc (0.59). Also, initial economic freedom is correlated with investment (0.47), initial GDP pc (0.69), and urban population (0.55). Although our main variables are correlated with each other and with some of the additional controls, we believe it is important to include these variables in order to substantiate our results. In order to do so, we rely on a variety of regression specifications and acknowledge the presence of endogeneity among our independent variables. In order to address this issue, we show the results with a variety of

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[10] The seven time periods are 1974 (average 1970–1974), 1979 (average 1975-1979), 1984 (average 1980–1984), 1989 (average 1985–1989), 1994 (average 1990–1994), 1999 (average 1995–1999), and 2004 (average 2000–2004), unless otherwise noted.

combinations of the variables in addition to implementing lagged values in order to minimize the endogeneity effect (presented in section 4).

As a benchmark, we first show the basic relationship between economic growth and our main variables of interest: culture, initial economic freedom, and changes in freedom. To do so, we employ ordinary least squares (OLS) estimations on our panel dataset. The regression is identified as:

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

where G equals the growth rate and M represents the different combinations of our main variables.

The benchmark OLS regressions are shown in table 1.

Table 1: Economic Freedom, Culture, and Growth
Panel OLS Regressions - Benchmark Specification

Dependent Var: Growth Rate

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Culture	0.44***				0.13	0.21*	0.14
	(0.14)				(0.12)	(0.12)	(0.12)
Initial econ freedom		0.71***		0.57***	0.85***		0.61**
		(0.14)		(0.13)	(0.22)		(0.21)
Change econ freedom			0.56**	0.30		0.64**	0.44
			(0.25)	(0.24)		(0.30)	(0.30)
Initial gdppc (log)	-1.88***	-0.61***	-0.04	-0.51***	-1.83***	-1.14***	-1.64***
	(0.51)	(0.16)	(0.11)	(0.15)	(0.30)	(0.28)	(0.31)
Constant	18.11***	4.50***	3.62***	4.36***	14.08***	12.56***	13.74***
	(4.26)	(1.03)	(1.01)	(1.02)	(2.03)	(2.19)	(2.13)
Observations	205	621	556	556	180	168	168
Adj. R-squared	0.11	0.04	0.01	0.05	0.21	0.18	0.23

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

Columns (1) through (7) report the results from our multiple combinations of variables. Column (1) shows that culture is positive and highly significant, directly affecting economic growth. This result suggests that a one unit increase in the culture index increases the growth rate by 0.44 percentage points, thus supporting hypothesis 1a and previous work on culture and growth (Guiso, et al. 2006; Tabellini 2009). Column (2) reports that economic freedom at the beginning of the period positively and significantly affects growth. A one unit increase in initial economic freedom increases the growth rate by 0.71 percentage points. In column (3) changes in economic freedom also positively and significantly impact the growth rate with a coefficient of 0.56. When controlling for initial income and both initial freedom and changes in freedom (as suggested by Dawson 1998 and Lawson 2006), initial freedom remains significant, while the change in freedom loses its significance.[11] Overall, columns (2) through (4) support the positive and significant relationship found in the large empirical literature on economic freedom and growth. These results support hypothesis 2a.

Columns (5) through (7) combine culture and economic freedom in the regressions. When controlling for initial economic freedom, culture becomes insignificant. Economic freedom retains its positive and significant relationship with growth. Comparing columns (2) to (5) shows that the coefficient on initial economic freedom increases from 0.71 to 0.85, and the R-squared increases from 0.04 to 0.21. Column (6) reports that both culture and changes in economic freedom are positive and significant. Culture's coefficient decreases by over half (0.44 to 0.21), suggesting that a

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[11] This may not be a surprising result due to the correlation factor.

one unit increase in culture results in a 0.21 percentage point increase in growth. A one-standard-deviation increase in the change in economic freedom results in a 0.42 percentage point increase in growth. Column (7) controls for culture, initial freedom, and changes in freedom simultaneously. Initial economic freedom remains positive and significant. Both culture and changes in freedom are insignificant in this specification.

Comparing regressions (1) through (4) with (5) through (7) suggests that economic freedom is a strong contributor to economic performance.[12] Culture displays a positive but milder effect on growth. Comparing the R-squares suggests that by controlling for both culture and one of the measures of freedom explains much more of the variation in growth than when controlling for culture or freedom individually. Overall, the results support previous findings where culture, in some specifications, supports growth, and economic freedom is an important contributor to economic performance.

4.2 Core Panel Analysis and Results

We now turn to our main model specification, where we implement a fixed effects model, replicating table 1 as well as adding in our two control vectors.[13] Our main model specification can be identified as:

$$G_{it} = \mu + \beta M_{it} + Z_{it}\,{}^{\grave{}}\delta + \varepsilon_{it}$$

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[12] Our results are slightly different from other studies on economic freedom and growth because once we control for initial freedom, the change in freedom is often insignificant.

[13] The Hausman test confirmed the superiority of a fixed effect model over a random effects model.

where G equals the growth rate, M is our main variables of interest—culture, initial freedom, and changes in freedom—and Z represents the vector of control variables, including country dummies.

Table 2 replicates table 1, except we now use a fixed effects model instead of OLS estimation.

Table 2: Economic Freedom, Culture, and Growth
Panel Fixed Effects Regressions - Main Specification

Dependent Var: Growth Rate

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Culture	0.92**				0.38*	0.33	0.30
	(0.38)				(0.22)	(0.21)	(0.20)
Initial econ freedom		1.09***		1.06***	1.23***		0.67***
		(0.14)		(0.23)	(0.34)		(0.19)
Change econ freedom			0.42	-0.23		0.93**	0.59
			(0.27)	(0.35)		(0.37)	(0.39)
Initial gdppc (log)	-5.39**	-4.55***	-2.57***	-4.03***	-4.35***	-1.78**	-2.99***
	(2.31)	(0.67)	(0.49)	(0.66)	(1.26)	(0.57)	(0.72)
Constant	47.50**	36.13***	25.46***	32.05***	33.52**	17.77***	24.82***
	(19.57)	(5.44)	(4.30)	(4.96)	(9.79)	(4.82)	(5.75)
Observations	205	621	556	556	180	168	168
Number of countries	87	121	121	121	74	69	69
Adj. R-squared	0.12	0.13	0.07	0.12	0.16	0.13	0.17

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

Column (1) controls only for culture and reports that the culture index has a positive and highly significant direct impact on growth. A one-unit increase in the culture index (for example, going from Romania to Luxembourg) would increase growth by 0.92 percent, a rather substantial amount when compared to the 3.54 average growth rate of our sample of countries. The effect of a one standard deviation increase in culture on growth equals

a 1.67 percent increase. These regressions provide evidence supporting Hypothesis 1a, where increases in trust, respect, and self-determination and decreases in obedience support an environment conducive to economic growth.

Results presented in column (2) are similar to the previous OLS results, where initial economic freedom is positive and significant, but it now has a higher coefficient. For example, a one-unit increase in the freedom index increases economic growth by over 1 percent, again a substantial increase when compared to the average growth rate of our sample. If a country improves from the lowest score to the highest, it would experience an increase in growth by 7.77 percent. In addition, initial freedom and income explain 13 percent of the variation in growth across countries. The difference in freedom score remains positive but is now insignificant in columns (3) and (4), whereas initial freedom remains positive and significant in column (4). Combined, we view these results as providing substantial evidence in support of Hypothesis 2a. Economic freedom, whether measured as initial freedom or changes in freedom, displays a strong positive and significant relationship with growth in the majority of our regressions presented thus far.

In column (5), both culture and initial economic freedom are now positive and significant, whereas in the OLS specification, only initial freedom was significant. A one-unit increase in the culture index leads to a 0.38 percentage-point increase in growth, and a one-unit increase in initial freedom results in a 1.23 percentage-point increase in growth. The significance of culture disappears in regressions (6) and (7) once we control for changes in economic institutions. Initial freedom remains positive and significant

with the addition of change in freedom in column (7), but changes in economic freedom

are only significant in regression (6), consistent with the OLS results.

In order to provide a more complete model specification, we re-estimate

regressions (1) through (7) but now include our additional control variables. Table 3

reports the regressions when we include control vector one (the investment share of GDP

and population growth), and table 4 shows the results with control vectors one and two

(percent urban population, inflation rate, government share of GDP, and log of the area).

Table 3: Economic Freedom, Culture, and Growth
Panel Fixed Effects Regressions With Controls

Dependent Var: Growth Rate						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Culture						
0.65**				0.32	0.29	0.27
(0.32)				(0.21)	(0.20)	(0.19)
Initial econ freedom						
	1.00***		0.84***	1.10***		0.61**
	(0.13)		(0.22)	(0.31)		(0.19)
Change econ freedom						
		0.50***	-0.03		0.77**	0.49
		(0.17)	(0.23)		(0.36)	(0.40)
Invest/GDP						
0.14	0.16***	0.17***	0.15***	0.18	0.11	0.11
(0.19)	(0.05)	(0.04)	(0.04)	(0.11)	(0.10)	(0.10)
Pop. Growth						
-0.70**	-0.23	-0.46**	-0.41*	-0.44	-0.91	-0.68
(0.27)	(0.47)	(0.20)	(0.22)	(0.75)	(0.64)	(0.64)
Initial gdppc (log)						
-4.07***	-4.37***	-2.54***	-3.70***	-4.94***	-2.59***	-3.59***
(1.22)	(0.58)	(0.48)	(0.59)	(1.36)	(0.74)	(0.86)
Constant						
35.04***	32.97***	23.31***	28.71***	36.99***	24.18***	29.54***
(9.66)	(4.98)	(4.23)	(4.63)	(10.24)	(6.41)	(6.52)
Observations						
204	621	556	556	180	168	168
Number of countries						
87	121	121	121	74	69	69
Adj. R-squared						
0.11	0.18	0.16	0.19	0.18	0.15	0.18

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

The results with our additional controls are presented in table 3. Culture and initial

freedom remain positive and significant (columns 1 and 2). Change in economic freedom

is also now significant (column 3). One major difference is that culture is no longer significant in any of the results presented in regressions (5)–(7). Regression (1) suggests that culture may display a direct, positive, and significant effect on growth, but this effect diminishes once we control for either measure of economic freedom and our control vector. In all four regressions, initial freedom is always significant, and the change in freedom is significant in two out of four regressions. Also, the additional control variables do not add any explanatory power to the model, as suggested by the similar R-squares. As we would expect, investment to GDP positively and significantly impacts economic growth in three of eight regressions.[14] Additionally, population growth is negative and significant in three of eight regressions presented.

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[14] Investment may lose its significance in the other regression specifications due to the endogeneity concerns discussed above.

Table 4: Economic Freedom, Culture, and Growth
Panel Fixed Effects Regressions With Controls

	Dependent Var: Growth Rate						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Culture	0.54*				0.28	0.25	0.23
	(0.31)				(0.22)	(0.20)	(0.20)
Initial econ freedom		0.93***		0.66***	1.02**		0.55*
		(0.20)		(0.25)	(0.38)		(0.29)
Change econ freedom			0.39**	0.03		0.69*	0.48
			(0.16)	(0.22)		(0.36)	(0.39)
Invest/GDP	0.13	0.15***	0.17***	0.15***	0.16	0.11	0.11
	(0.18)	(0.04)	(0.04)	(0.04)	(0.12)	(0.11)	(0.10)
Pop. Growth	-0.28	-0.23	-0.45**	-0.43**	0.05	-0.75	-0.67
	(1.01)	(0.49)	(0.21)	(0.21)	(0.89)	(0.69)	(0.69)
Urban pop. %	0.31**	0.00	0.03	0.00	0.14	0.06	0.05
	(0.14)	(0.05)	(0.03)	(0.03)	(0.14)	(0.12)	(0.12)
Inflation rate	-0.002	-0.001***	-0.001***	-0.001***	0.0002	-0.001*	-0.001
	-0.002	(0.0002)	(0.0001)	(0.0001)	(0.001)	(0.0004)	(0.001)
Gov/GDP	-0.12	0.01	-0.01	0.00	-0.15	-0.04	-0.04
	(0.17)	(0.05)	(0.04)	(0.04)	(0.14)	(0.11)	(0.11)
Area (log)	13.17	151.86***	41.01	55.47	100.26	164.90	113.42
	(370.49)	(47.82)	(47.19)	(47.70)	(427.74)	(342.23)	(372.87)
Initial gdppc (log)	-7.81***	-4.51***	-2.76***	-3.55***	-6.30**	-3.40**	-4.12**
	(2.15)	(0.71)	(0.55)	(0.67)	(2.04)	(1.45)	(1.45)
Constant	-115.80	-1,806.67***	-476.64	-648.83	-1,238.41	-2,099.01	-1,430.56
	(4708.21)	(581.14)	(577.11)	(583.30)	(5471.72)	(4416.23)	(4812.99)
Observations	192	584	530	530	175	164	164
Number of countries	81	118	118	118	72	67	67
Adj. R-squared	0.19	0.19	0.20	0.22	0.19	0.16	0.17

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

Table 4 presents the regressions including both control vectors. Again, as in table 3, our

same results persist. Culture is positively and significantly related to economic growth in

regression (1) only. Once we control for economic freedom and add our control vectors,

culture's significance disappears (columns 5–7). Both measures of economic freedom

remain highly significant in most of the regressions, even with the inclusion of the

additional variables. As before, the addition of control vector two to the model does not add any further explanatory power to our model. Investment is positive and significant in three regressions, and population growth is negative and significant in two of the specifications. Urban population is positive but insignificant in seven out of eight regressions. The inflation rate is almost always negative and is significant in three out of the eight regressions. Finally, the size of government is never significant, while the area of a country has a positive sign but is only significant in one regression.

Overall, we view our benchmark and core analysis as providing evidence that economic institutions supporting private property rights, rule of law, and enforcement of contracts are a strong determinant of economic growth. This result remains in both models and across a variety of regression specifications. Our results show a mild, positive, and significant direct relationship between culture and economic growth. When we do not control for economic freedom, culture is significant in all regressions, even when including additional control variables. However, when controlling for either measure of economic freedom, culture is only significant in two out of twelve regressions. Once the control vectors are introduced with economic freedom, it is never significant. We view this as suggesting that culture's connection with economic growth may be more complicated than previously suggested (for example, see Tabellini 2008).

V. Sensitivity Analysis

5.1 Correlation or Causation?

In this section, we provide sensitivity analysis to address potential concerns with endogeneity and reverse causality. We also provide results with additional control variables to test for omitted variable bias and further substantiate our claims.

Our first sensitivity check provides additional justification that our results imply causation and not just correlation. The possibility that economic growth may cause more economic freedom, as well as cultivate "better" culture, in the future is a plausible argument (see Glaeser, et al. 2004.). It may be that our strong results above are due to the case that countries that grow tend to become freer and exhibit more trust and respect. The utilization of a time dimension in the panel analysis above provides a means for controlling for this potential reverse causality by relating freedom and culture to subsequent growth rates (Dawson 1998). Our specification increases the likelihood that our results imply causal relationships, where more freedom and culture leads to more growth, not vice versa. However, in order to provide robustness to these results, we provide two sensitivity checks.

We first re-estimate our main regressions, replacing initial freedom with a one-period lag (as suggested by Gwartney, et al. 1999). Economic freedom may also exert a lagged impact on growth, and this specification will capture that effect. This means that economic freedom in 1970 (initial level for the first period average 1970–1974) is now matched with growth from the second period, the average from 1975 to 1979, and so on. The results are reported below in table 5.

Table 5: Economic Freedom, Culture, and Growth
Panel Fixed Effects Regressions With Lagged Values

	Dependent Var: Growth Rate					
	(1)	(2)	(3)	(4)	(5)	(6)
Culture			0.36	0.30	0.27	0.23
			(0.22)	(0.19)	(0.19)	(0.19)
Initial econ freedom	0.85***	1.24***	0.42*	0.93***	0.86***	0.85**
(1 pd. Lag)	(0.29)	(0.26)	(0.21)	(0.23)	(0.22)	(0.29)
Change econ freedom		0.88***		1.30**	1.16**	1.14**
		(0.28)		(0.40)	(0.40)	(0.44)
Invest/GDP					0.10	0.10
					(0.10)	(0.10)
Pop. Growth					-0.56	-0.56
					(0.61)	(0.67)
Urban pop. %						0.04
						(0.11)
Inflation rate						0.00
						(0.00)
Gov/GDP						-0.04
						(0.11)
Area (log)						68.60
						(367.68)
Initial gdppc (log)	- 4.00***	- 4.43***	- 2.59***	- 3.40***	- 3.91***	-4.46**
	(0.90)	(0.91)	(0.61)	(0.80)	(0.90)	(1.48)
Constant	33.06***	34.30***	22.82***	27.02***	30.95***	-850.62
	(6.58)	(6.94)	(4.97)	(6.36)	(6.81)	(4745.85)
Observations	505	505	168	168	168	164
Number of countries	121	121	69	69	69	67
Adj. R-squared	0.09	0.13	0.07	0.20	0.21	0.20

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

As shown, lagged initial freedom exhibits a strong positive and significant

relationship with growth. A one-unit increase in economic freedom increases growth by

0.85 percent in the following period and explains 9 percent of the variation. Regression

(2) shows that both initial (lagged) freedom and changes in freedom are positive and

highly significant. Initial freedom's coefficient increases, suggesting that a one unit increase in the previous period's freedom score increases growth by 1.24 percent. A one-unit increase in the change in freedom increases growth by 0.88 percent. Culture is now insignificant in all four regressions, while both measures of economic freedom are always positive and highly significant in all regressions. These results support our claim above that economic freedom is a primary determinant of economic growth and culture's impact diminishes in the presence of strong economic institutions. This analysis adds robustness to our claim that our results suggest causation between economic freedom, culture, and growth; however, we provide an additional check in table 6 below.

In order to provide a "direct" test for causation between economic growth, freedom, and culture, we provide a simple check where we utilize both lagged and future values of changes in freedom, changes in culture, and our growth rate. To test this proposition, the first four regressions keep growth as our dependent variable but use a one period lag or one period future value of either change in freedom or change in culture as the independent variables (only initial GDP pc is also included). Next, we use either change in freedom or change in culture as the dependent variable and the growth rate as the only independent variable.

Table 6: Economic Freedom, Culture, and Growth

Panel Fixed Effects Regressions With Lagged and Future Values

	Dep. Var: Growth rate				Dep. Var: Change freedom	Dep. Var: Change culture
	(1)	(2)	(3)	(4)	(5)	(6)
Change econ freedom	0.638***					
(1 pd. Lag)	(0.237)					
Change econ freedom		-0.015				
(1 pd. Forward)		(0.211)				
Change culture			0.031			
(1 pd. Lag)			(0.029)			
Change culture				-0.003		
(1 pd. Forward)				(0.014)		
Growth					-0.003	0.787
(1 pd. Lag)					(0.012)	(1.114)
Initial gdppc (log)	-3.131***	-4.025***	-0.917	-1.971*	0.200	-25.865*
	(0.756)	(0.727)	(3.261)	(1.094)	(0.159)	(15.053)
Constant	30.421***	38.021**	11.930	20.350**	-1.508	235.466*
	(6.555)	(6.232)	(29.987)	(9.908)	(1.371)	(136.660)
Observations	437	551	81	99	553	107
Number of countries	111	120	50	53	121	56
Adj. R-squared	0.09	0.10	0.03	0.02	0.00	0.04

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

If economic growth causes more freedom or enhances cultural aspects directly, the future values of freedom and culture should be statistically significant. However, as shown in columns (2) and (4), this is not the case. These results suggest that more growth is not correlated with more freedom or increased culture in the future; therefore, the evidence suggests that economic growth is not causing changes in freedom or culture. This claim is also supported by regressions (5) and (6), where either change in freedom or change in culture is the dependent variable, and the growth rate, lagged one period, is the only independent variable. In both regressions, economic growth is insignificant. Economic growth in the previous period exerted no effect on either freedom or culture in

the following period. However, economic freedom in the previous period (the lagged value), as shown in regression (1), continues to support economic growth in the following period (a coefficient of 0.64 and a significance level at 99 percent), supporting our previous findings.[15]

5.2 Additional Controls

Our last 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 a measure of 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 2001, 2002). This is collected from WDI 2006.

Our second additional control is designed to capture any effects on growth due to geography. We use 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. Therefore, we include latitude to control for the impact of geography on growth.

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[15] We also ran these regressions without controlling for initial GDP per capita and found no significant changes.

Our last control variable is legal origin. The idea that many countries have a distinct legal origin is identified by La Porta, et al. (1999, 2004). Legal origin captures 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 7: Economic Freedom, Culture, and Growth						
Panel Fixed Effects Regressions With Additional Controls						
Dependent Var: Growth Rate						
	(1)	(2)	(3)	(4)	(5)	(6)
Culture	0.04	0.22	0.18	-0.03	0.17	0.13
	(0.59)	(0.19)	(0.23)	(0.17)	(0.19)	(0.22)
Initial econ freedom	2.32**	0.71***	0.70***	1.47*	0.66**	0.60**
	(1.12)	(0.17)	(0.17)	(0.73)	(0.28)	(0.28)
Change econ freedom	0.68	0.60	0.70*	0.40	0.51	0.58
	(0.62)	(0.37)	(0.38)	(0.27)	(0.41)	(0.41)
Primary sch. enrollment	6.99*			7.37**		
	(4.05)			(2.30)		
Geography		1.25			1.10	
		(0.92)			(0.80)	
English legal origin			0.29			0.28
			(0.35)			(0.42)
French legal origin			0.35			0.31
			(0.41)			(0.44)
Invest/GDP				0.43***	0.04	0.05
				(0.09)	(0.09)	(0.10)
Pop. Growth				-2.64**	-0.52	-0.62
				(1.09)	(0.79)	(0.76)
Urban pop. %				-0.58**	0.18**	0.18*
				(0.20)	(0.09)	(0.09)
Inflation rate				-0.00	0.00	0.00
				(0.00)	(0.00)	(0.00)
Gov/GDP				-0.05	-0.10	-0.08
				(0.14)	(0.10)	(0.11)
Area (log)				-2,056.09**	219.80	242.71
				(997.57)	(360.37)	(382.46)
Initial gdppc (log)	-7.30**	-2.98***	-2.63***	-4.91**	-5.27***	-5.00***
	(2.75)	(0.72)	(0.70)	(2.13)	(1.21)	(1.22)
Constant	52.98**	24.61***	21.74***	26,868.18**	-2,797.95	-3,096.07
	(23.76)	(5.80)	(5.44)	(13007.48)	(4648.40)	(4933.65)
Observations	48	155	155	48	151	151
Number of countries	26	69	69	26	67	67

Adj. R-squared	0.51	0.20	0.18	0.87	0.24	0.22

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

Table 7 presents regressions with the three additional controls. In all regressions, we include initial income, initial freedom, and change in freedom. We do so to provide the most difficult case for significance of our variables of interest. Regressions (4) through (6) include all of our previous control variables. In both regressions (1) and (4), education positively and significantly impacts economic growth. In these same two regressions, initial economic freedom is highly significant and change in freedom and culture are insignificant. In both regressions controlling for geography, latitude is positive but never significant. Initial freedom is significant in both, and culture and the difference in freedom is insignificant in both regressions. In regressions (3) and (6), legal origin is insignificant as well as culture. Initial freedom is significant in both and change in freedom is significant in regression (3) only. It is worth noting that the inclusion of education significantly increases the R-squares, whereas geography and legal origin only marginally explain additional growth variations.

Overall, our results from the panel models and the robustness checks suggest that our results are capturing the causal relationship of economic freedom and culture and their subsequent relationship with growth and are minimizing biases from measurement error or endogeneity.

VI. Conclusion

While both culture and economic freedom have been recognized as potentially important for economic growth, a comprehensive empirical study examining the relative effects of

both was absent from the literature. Our paper is one attempt to fill this gap in the literature.

Our results indicate that economic freedom is relatively more important for growth than culture, though we do not dismiss the effects of culture on growth. Culture is significant in several specifications, though it has a smaller effect than that of economic freedom. The significance of the culture variable disappears in the majority of regressions controlling for additional variables, including economic freedom. We view this as suggesting that culture's connection with economic growth may be more elusive than previously thought. One possible explanation for this finding is that when private property rights and contracts are not formally enforced, individuals rely on informal norms, such as trust and respect, to substitute for this function, hence the positive and significant impact from culture on growth. However, once economic institutions exist that provide these functions, culture become less important and may not display such a strong effect in the growth regression.

It is also possible that culture affects economic growth through indirect channels rather than through a direct relationship. This would potentially explain our results. Future research into these possible channels could shed more light on this complex relationship, providing new insights into the determinants of economic growth and how culture may support a prosperous society.

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	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, *Economic Freedom on the World*
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.	European and World Values Surveys, 1981-2007
GDP pc (log)	Real GDP per capita in 2000 constant dollars, log form.	Penn World Tables version 6.2
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
Inflation Rate	Inflation is measured by the rate of increase in the price index.	World Development Indicators 2006
Government share of GDP	Ratio of size of government to GDP in 2000 constant dollars.	Penn World Tables version 6.2
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, Lopez-de-Silanes, Shleifer, and Vishny 1999
Legal Origin	Dummy variables representing English or French legal origins.	La Porta, Lopez-de-Silanes, Shleifer, and Vishny 1999

Country	Culture		Growth		Economic Freedom			
	Index	Rank	Rate	Rank	Index	Rank	Change	Rank
Albania	2.89	73	2.44	103	4.97	95	1.09	10
Algeria	1.59	86	4.16	45	4.00	127	0.17	64
Andorra	5.25	23						
Argentina	4.65	36	2.41	105	4.90	97	0.20	59
Armenia	4.15	50	0.33	131	6.46	30		
Australia	7.16	9	3.53	66	7.37	9	0.10	84
Austria	6.50	15	2.97	85	6.83	20	0.19	61
Azerbaijan	3.72	57	-1.13	137	5.65	70		
Bahamas, The			3.18	80	6.51	25	0.00	105
Bahrain			3.81	54	7.11	15	-0.05	117
Bangladesh	4.81	29	3.39	72	4.47	118	0.47	23
Barbados			3.00	83	6.31	34	0.05	98
Belarus	4.19	49	0.78	129				
Belgium	4.74	31	2.70	97	7.31	10	-0.05	118
Belize			5.98	16	5.67	68	0.20	60
Benin			3.49	68	5.30	81	0.09	88
Bolivia			2.47	102	5.27	84	0.50	21
Bosnia and Herzegovina	3.36	67	19.47	1				
Botswana			9.90	4	6.19	38	0.42	27
Brazil	2.26	78	4.48	35	4.68	112	0.09	87
Bulgaria	4.25	45	1.29	124	4.89	98	0.22	52
Burkina Faso	0.92	89	3.68	60				
Burundi			2.69	98	4.55	114	0.11	79
Cameroon			3.66	61	5.53	76	0.11	81
Canada	7.56	8	3.42	71	7.73	6	0.01	104
Central African Republic			1.34	123	4.47	119	0.30	38
Chad			3.23	78	4.84	102	0.28	40
Chile	3.67	59	4.34	38	5.94	54	0.57	19
China	8.04	6	8.80	5	5.28	83	0.39	30
Colombia	3.65	60	4.02	51	5.15	91	0.01	103
Congo, Dem. Rep.			-0.18	133	3.72	130	-0.02	110
Congo, Rep.			4.38	37	4.52	115	-0.01	106
Costa Rica			4.84	29	6.27	36	0.20	58
Cote d'Ivoire			3.26	76	5.66	69	0.11	80
Croatia	5.08	26	-0.13	132	5.19	89	1.81	3
Cyprus	3.38	66	6.32	14	6.02	53	0.21	55
Czech Republic	5.49	21	0.85	128	6.30	35	0.98	11
Denmark	9.02	2	2.17	110	7.00	17	0.09	85
Dominican Republic	4.20	48	4.99	27	5.42	78	0.21	56
Ecuador			3.84	53	5.08	93	0.27	45
Egypt, Arab Rep.	2.68	74	5.18	22	5.19	88	0.44	25
El Salvador	2.28	77	2.57	100	5.61	73	0.64	16
Estonia	4.59	37	1.81	116	6.58	24	2.06	1
Ethiopia	2.58	75	3.13	82				
Fiji			3.43	70	5.78	61	0.13	73
Finland	8.71	3	3.15	81	7.13	14	0.09	86

France	4.27	44	2.95	86	6.47	29	0.06	94
Gabon			4.53	34	4.69	110	0.35	34
Georgia	3.87	54	1.35	122	6.16	39		
Germany	6.63	14	2.22	108	7.48	8	-0.04	115
Ghana	0.77	90	2.68	99	4.42	120	0.49	22
Greece	5.22	24	3.50	67	6.08	46	0.08	89
Guatemala			3.74	57	6.07	47	0.06	97
Guinea-Bissau			2.43	104	3.93	128	0.79	13
Guyana			1.69	119	5.27	85	1.18	8
Haiti			0.76	130	6.07	48	-0.12	119
Honduras			3.93	52	6.06	49	0.15	68
Hong Kong, China	5.71	18	6.60	12	8.97	1	-0.04	113
Hungary	4.01	52	2.90	88	5.74	65	0.63	17
Iceland	6.87	11	3.70	59	6.32	32	0.19	62
India	3.17	71	4.73	30	5.28	82	0.16	66
Indonesia	5.11	25	5.95	17	5.77	63	0.15	67
Iran, Islamic Rep.	4.76	30	2.74	95	4.99	94	0.03	101
Iraq	3.63	61	13.55	2				
Ireland	5.35	22	5.06	25	7.25	12	0.14	71
Israel			5.08	23	4.86	99	0.29	39
Italy	4.83	28	2.83	92	6.05	50	0.14	70
Jamaica			1.82	114	5.67	67	0.70	15
Japan	6.76	12	4.15	46	7.02	16	0.06	96
Jordan	4.38	42	6.40	13	5.87	57	0.32	36
Kenya			4.62	31	5.15	90	0.26	47
Korea, Rep.	5.78	17	7.48	7	5.92	55	0.25	51
Kuwait			4.44	36	6.12	43	0.46	24
Kyrgyz Republic	3.83	55	1.14	125				
Latvia	4.65	35	3.18	79	5.85	58	1.89	2
Lithuania	4.65	34	-0.81	135	5.72	66	1.66	4
Luxembourg	5.60	20	4.06	50	7.82	5	-0.01	107
Macedonia, FYR	4.11	51	-0.78	134	5.77	64		
Madagascar			1.64	120	4.74	105	0.37	33
Malawi			4.29	41	4.90	96	0.07	93
Malaysia	4.25	46	6.67	10	6.93	19	-0.04	114
Mali	2.01	83	3.31	75	5.27	86	0.11	82
Malta	3.18	70	6.20	15	6.03	52	0.28	42
Mauritius			5.32	20	6.15	41	0.39	29
Mexico	4.25	47	4.14	47	5.89	56	-0.02	109
Moldova	3.82	56	-1.23	138				
Mongolia			4.08	49	6.32	33		
Morocco	2.14	80	4.22	44	5.24	87	0.06	95
Mozambique			3.71	58	5.42	79		
Myanmar			4.96	28	4.50	116	-0.31	122
Namibia			2.92	87	6.21	37	0.55	20
Nepal			3.57	65	5.32	80	-0.05	116
Netherlands	7.13	10	2.88	89	7.50	7	0.03	102
New Zealand	8.50	4	2.50	101	7.22	13	0.25	49
Nicaragua			1.77	117	4.24	124	0.62	18

Niger			1.43	121	4.58	113	-0.01	108
Nigeria	2.24	79	3.58	62	4.09	126	0.30	37
Norway	8.09	5	3.57	64	6.67	23	0.13	74
Oman			10.15	3	6.68	22	0.14	71
Pakistan	2.45	76	5.29	21	4.86	100	0.18	63
Panama			4.22	43	6.51	26	0.08	91
Papua New Guinea			3.37	73	6.04	51	-0.13	120
Paraguay			4.29	40	5.81	60	0.12	76
Peru	2.06	82	2.83	91	4.77	103	0.38	32
Philippines	2.11	81	3.80	55	5.85	59	0.15	68
Poland	2.94	72	3.34	74	4.86	101	0.75	14
Portugal	3.30	68	3.75	56	6.13	42	0.17	65
Puerto Rico	3.52	62	4.56	33				
Romania	4.56	38	0.86	127	4.69	109	0.28	44
Russian Federation	4.51	40	-0.98	136	4.71	107	1.24	5
Rwanda	0.00	92	4.30	39	3.84	129	-0.02	111
Saudi Arabia	4.51	39	5.40	18				
Senegal			2.75	94	5.12	92	0.26	46
Serbia and Montenegro	3.20	69	2.78	93				
Sierra Leone			0.98	126	4.71	108	-0.03	112
Singapore	3.44	65	8.19	6	8.21	2	0.07	92
Slovak Republic	3.97	53	1.72	118	6.10	44	1.13	9
Slovenia	4.50	41	2.03	111	5.57	74	1.22	6
South Africa	3.49	63	2.88	90	6.10	45	0.04	100
Spain	4.72	32	3.57	63	6.48	28	0.12	78
Sri Lanka			4.59	32	5.62	72	0.20	57
Sweden	10.00	1	2.36	107	6.49	27	0.25	50
Switzerland	7.95	7	1.82	115	8.14	3	0.04	99
Syrian Arab Republic			5.34	19	4.32	122	0.13	75
Taiwan	4.35	43			6.98	18	0.08	90
Tanzania			4.11	48	4.39	121	0.34	35
Thailand	4.70	33	6.72	9	6.43	31	0.12	77
Togo			3.49	69	4.73	106	0.22	54
Trinidad and Tobago	1.81	85	2.71	96	5.78	62	0.44	26
Tunisia			5.06	26	5.53	75	0.22	53
Turkey	2.01	84	4.24	42	4.76	104	0.28	41
Uganda	0.59	91	5.06	24	4.12	125	0.83	12
Ukraine	3.44	64	-1.55	139	4.49	117	1.18	7
United Arab Emirates			6.82	8	6.82	21	0.38	31
United Kingdom	5.65	19	2.39	106	7.25	11	0.28	43
United States	6.75	13	3.25	77	8.06	4	0.10	83
Uruguay	4.90	27	1.84	113	6.15	40	0.25	48
Venezuela, RB	3.71	58	2.19	109	5.62	71	-0.35	123
Vietnam	5.84	16	6.63	11	5.49	77		
Zambia	1.41	87	1.89	112	4.68	111	0.41	28
Zimbabwe	1.27	88	2.98	84	4.25	123	-0.26	121

Appendix 3: Summary Statistics					
Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
Growth	686	3.54	3.11	-11.48	21.21
GDP pc	624	9,063.55	8,775.49	488.16	59,880.20
Initial gdppc (log)	692	8.59	1.09	5.88	10.78
Culture	228	4.82	1.82	0.00	10.00
Initial econ freedom	640	5.79	1.28	2.10	9.23
Change econ freedom	570	0.20	0.65	-2.22	2.31
Invest/GDP	693	16.13	8.44	2.21	50.97
Pop. Growth	693	1.70	1.51	-20.36	7.07
Urban pop. %	693	54.82	23.39	3.67	100.00
Inflation rate	663	47.22	324.34	-3.01	6,424.96
Gov/GDP	693	20.34	8.60	2.55	67.43
Area (log)	679	12.19	2.01	5.77	16.61
Primary School rate	70	0.54	0.25	0.06	0.97
Latitude	643	0.27	0.18	0.01	0.72
English legal origin	643	0.37	0.48	0.00	1.00
French legal origin	643	0.42	0.49	0.00	1.00

			Initial	Change	Initial	Invest/	Pop	Urb.	Area		Gov/	Prim.			
	Growth	Cult.	econ free	econ free	gdppc	GDP	growth	pop	(log)	Infl.	GDP	sch.	Geo.	English	French
Growth	1.00														
Culture	0.02	1.00													
Initial econ freedom	0.14	0.52	1.00												
Change econ freedom	0.14	-0.19	0.22	1.00											
Initial gdppc (log)	-0.08	0.59	0.69	-0.03	1.00										
Invest/GDP	0.17	0.54	0.47	-0.03	0.40	1.00									
Pop growth	0.18	-0.21	-0.27	0.01	-0.26	-0.17	1.00								
Urban pop %	-0.07	0.35	0.55	0.02	0.81	0.40	-0.19	1.00							
Area (log)	-0.01	0.07	-0.19	-0.04	-0.15	0.04	0.11	-0.13	1.00						
Inflation rate	-0.29	-0.13	-0.23	-0.10	-0.04	-0.05	-0.03	0.03	0.08	1.00					
Gov/GDP	-0.08	-0.13	-0.24	0.10	-0.17	-0.11	-0.05	-0.15	-0.22	0.05	1.00				
Primary school rate	0.08	0.64	0.73	-0.35	0.76	0.36	0.07	0.37	0.05	-0.26	-0.28	1.00			
Geography	0.04	-0.02	0.08	0.03	0.02	0.04	0.01	-0.02	0.01	0.00	0.02	-0.04	1.00		
English legal origin	0.00	-0.12	0.00	0.04	0.00	-0.04	-0.05	0.05	0.02	-0.02	0.04	-0.04	-0.28	1.00	
French legal origin	0.01	0.14	-0.03	-0.04	0.00	0.02	0.03	-0.03	-0.03	0.01	-0.05	0.01	-0.24	-0.63	1.00