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What Matters More, Institutions or Specifications? A Critical Assessment of the Correlates of Institutional Development

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Abstract: *It is accepted in most quarters that "institutions matter" when it comes to economic development. The problem is that there are many measures of the different dimensions of institutional environments. These dimensions' overlap while also correlating with other explanations of economic development. These correlations present thorny empirical issues for researchers. In addition, specification search methods may bias results (Leamer, 1983). This paper investigates six dimensions of institutional development using a corresponding institutional measure for each and their relationships to income levels or growth rates. Although the literature examining the relationship between institutions and economic development is extensive and has accepted the need for robustness checks, there are precedents for a full application of Leamer's preferred methodology. While we find that countries with improvements in economic freedom are likely to experience faster rates of economic growth, there is nevertheless support for Leamer's criticism*

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1. Introduction

Many economists accept the broad claim that "institutions matter" meaning that the path of economic growth and national development is determined, in part, by the country's policies and institutions (North, 1990). The consensus is that countries with *better* institutions will grow more rapidly and achieve higher levels of income over time than countries with *worse* institutions, even

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if it is not always clear which institutions really matter (Bardhan, 2005). This position has its critics (e.g., Glaeser et al., 2004; Devarajan, 2008; Rodrik 2012; Asadullah & Savoia, 2018), but most scholars in economic development see an important role for institutions of some kind.

Some scholars have suggested that the rule of law and good governance are critical for development and that the actual content of policy can take many forms (Rothstein, 2011). Acemoglu and Johnson (2005; 2012) emphasise property rights, contracting institutions, and ultimately the "inclusiveness" of political institutions as they facilitate development. Relatedly, there are those who argue that "soft" institutions related to culture such as social trust are the factors that matter most (Fukuyama, 1996; Putnam, 2000; Williamson, 2009). Others believe political institutions related to democracy, free and fair elections, competitive political processes, and freedom of speech and other human rights are most critical for development (e.g., Kurzman, Werum, & Burkhart, 2002). While this view is especially popular in political science, it is frequently disputed by economists (Barro, 1996; Olson, 1965; Buchanan & Tullock, 1962). Still others believe economic liberalism rather than political liberalism is essential. Limiting the scope and scale of government so that it can best perform its core functions of protecting life, liberty, and property are emphasised. This we see in the tradition of classical liberalism from the days of Adam Smith to Milton Friedman (1962).

Numerous quantitative measures attempt to measure institutional quality. These indicators differ in terms of what they are attempting to measure and their measurement methods. This paper investigates the robustness of a selection of measures of institutional quality. To measure good governance, we employ *Worldwide Development Indicators*; to measure culture and social trust, we make use of a combination of variables gathered from the *World Values Survey*; to measure democratic political institutions, we use the *Polity IV* dataset; to measure political freedom, we use Freedom House's *Freedom in the World*; and to measure economic liberalism, we use the *Economic Freedom of the World* dataset. As an additional historically-oriented institutional variable, we use data on British legal origins. In the following section, we will discuss the dimensions underlying each of these institutional measures.

To investigate robustness, we pay heed to Leamer's (1983) concern that large numbers of specifications are typically possible in applied research. When researchers are able to cycle through these specifications until they find one that "works," the reported p-values are no longer valid. To be robust in the sense of Leamer, a result should hold regardless of which control variables are included. Therefore, following Leamer's advice, we examine all possible specifications while holding certain controls constant. This allows us to investigate which of these institutional relationships appear

robust to the inclusion or exclusion of other institutional measures as recommended by de Hann and Sturm (2006). Fortunately, we do not need to run two million regressions like Sala-i-Martin (1997) as we focus on a limited set of institutional measures. Of the existing literature which follows Levine and Renelt (1992) in using one application of Leamer's Extreme Bound Analysis[1] regarding questions of economic growth, the closest exercise to what we perform in this paper is Carlsson and Lundstrom (2002) who investigated the robustness of the individual components of economic freedom. In any case, we share Leamer's (2010: 33) view that, "You and I know that truly consistent estimators are imagined, not real." Ultimately, this methodology addresses an entirely different set of issues than those typically found in applied econometrics. What it intends to address is also similar to the issues raised in the broader Replication Crisis currently impacting much of social science (see Ioannides et al. 2017).

We avoid complicating our methodologies by focusing on two straightforward cross-sections. Using panel methods forces researchers to make numerous econometric choices which would rapidly explode the number of specifications run (often in dimensional terms). For example, each regression could be run with and without fixed effects for country and year, immediately multiplying the number of regressions by four. This is to say nothing about random effects, multilevel modelling, or dynamic panels. Our goal is to keep the econometrics as simple as possible in order to hold many choices constant in order to focus on the selected institutional variables. Our headline results, therefore, correspond to a cross-section of countries. However, we also include the most straightforward application of panel data available to us that is inclusive of both year and country fixed effects. These specifications yield almost qualitatively identical results to our cross-section.

Our results lend limited support for the "institutions matter" hypothesis. The measures of governance, economic freedom, and political liberalism have some positive relationships with country income levels. Concerning growth, only economic freedom, or more specifically, the change in economic freedom, appears robustly related to growth. Given our inability to find consistent positive correlations between income and growth and many of these institutional variables, we are forced to conclude that Leamer's criticisms are not without merit. These criticisms hold regardless of whether it is appropriate to conceptualise these regressions in terms of causality.

2. Dimensions and Measures of Institutional Quality

We use six different measures of institutional quality; each focused on a somewhat different dimension: economic freedom, governance, democracy, political freedom, legal origins, and culture. There are many other cross-

country indicators of institutions that could be examined, but these six should allow us a solid basis for comparison.

The lines between these categories are blurry. A brief description of each follows.

Economic Freedom. The *Economic Freedom of the World* (EFW) index (Gwartney et al., 2014) published by the Fraser Institute is our measure of Economic Freedom. The authors define economic freedom as follows (Gwartney et al., 2014: 1):

> *The cornerstones of economic freedom are (1) personal choice, (2) voluntary exchange coordinated by markets, (3) freedom to enter and compete in markets, and (4) protection of persons and their property from aggression by others. Economic freedom is present when individuals are permitted to choose for themselves and engage in voluntary transactions as long as they do not harm the person or property of others. Individuals have a right to their own time, talents, and resources, but they do not have a right to take things from others or demand that others provide things for them. The use of violence, theft, fraud, and physical invasions are not permissible in an economically free society, but otherwise, individuals are free to choose, trade, and cooperate with others, and compete as they see fit.*
>
> *In an economically free society, the primary role of government is to protect individuals and their property from aggression by others. The EFW index is designed to measure the extent to which the institutions and policies of a nation are consistent with this protective function. Put another way, the EFW measure is an effort to identify how closely the institutions and policies of a country correspond with a limited government ideal, where the government protects property rights and arranges for the provision of a limited set of "public goods" such as national defence and access to money of sound value, but little beyond these core functions. In order to receive a high EFW rating, a country must provide secure protection of privately-owned property, even-handed enforcement of contracts, and a stable monetary environment. It also must keep taxes low, refrain from creating barriers to both domestic and international trade, and rely more fully on markets rather than government spending and regulation to allocate goods and resources. In many ways, a country's EFW summary rating is a measure of how closely its institutions and policies compare with the idealised structure implied by standard textbook analysis of microeconomics.*

The index is comprised of five areas, namely the size of government, the legal system and property rights, sound money, freedom to trade

internationally, and regulation. The index is composed of 42 variables and scored on a 0-10 scale. Hall and Lawson (2014) and de Haan et al. (2006) offer good surveys of the literature using the EFW index.

Governance. The World Bank (online) *Worldwide Governance Indicators* (WGI) is our measure of overall governance. The WGI was first developed by Kaufmann, Kraay, and Zoido-Lobatón (1999: 1), who describe the concept as follows:

> *We define governance broadly as the traditions and institutions by which authority is exercised. This includes (1) the process by which governments are selected, monitored and replaced, (2) the capacity of the government to effectively formulate and implement sound policies, and (3) the respect of citizens and the state for the institutions that govern economic and social interactions among them.*

It comprised hundreds of variables grouped into six areas: voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, the rule of law, and control of corruption. The WGI index is scaled so that the mean is 0 with a standard error of 1. See Inglehart and Welzel (2005) for a representative usage of the WGI index.

Democracy. The Centre for Systemic Peace's (online) *Polity IV* is our measure of the quality of democracy. It considers measures such as executive recruitment, constraints on executive authority, and political competition. See Leeson and Dean (2009) for a representative use of the Polity IV measure. Polity's website describes the concept:

> *The Polity conceptual scheme is unique in that it examines concomitant qualities of democratic and autocratic authority in governing institutions, rather than discreet (sic) and mutually exclusive forms of governance. This perspective envisions a spectrum of governing authority that spans from fully institutionalised autocracies through mixed, or incoherent, authority regimes (termed "anocracies") to fully institutionalised democracies.*
>
> *The "Polity Score" captures this regime authority spectrum on a 21-point scale ranging from -10 (hereditary monarchy) to +10 (consolidated democracy). The Polity scores can also be converted into regime categories in a suggested three-part categorisation of "autocracies "(-10 to -6), "anocracies" (-5 to +5) and three special values: (-66, -77 and -88), and "democracies" (+6 to +10).*
>
> *The Polity scheme consists of six component measures that record key qualities of (sic) executive recruitment, constraints on executive*

> *authority and political competition. It also records changes in the institutionalised qualities of governing authority.*

Political Freedom. The Freedom House (online) *Freedom in the World* index is our measure of political freedom, which includes civil liberties. This measure is described online as follows:

> *The report's methodology is derived in large measure from the Universal Declaration of Human Rights, adopted by the UN General Assembly in 1948. Freedom in the World is based on the premise that these standards apply to all countries and territories, irrespective of geographical location, ethnic or religious composition, or level of economic development. Freedom in the World operates from the assumption that freedom for all peoples is best achieved in liberal democratic societies.*
>
> *A country or territory is assigned two ratings (7 to 1)—one for political rights and one for civil liberties—based on its total scores for the political rights and civil liberties questions. Each rating of 1 through 7, with 1 representing the greatest degree of freedom and 7 the smallest degree of freedom, corresponds to a specific range of total scores.*

La Porta et al. (1999) used Freedom House data in their investigation of the determinants of government quality.

Legal Origins. Legal Origins is a dummy variable that takes a value of 1 if it has an English (common law) legal origin and 0 otherwise. This is based on the original work of La Porta et al. (1998: 1119):

> *The common law is formed by judges who have to resolve specific disputes. Precedents from judicial decisions, as opposed to contributions by scholars, shape common law. Common law has spread to the British colonies, including the United States, Canada, Australia, India, and many other countries.*

La Porta et al. (2008: 326) summarise the legal origin literature, "legal origins broadly interpreted as highly persistent systems of social control of economic life have significant consequences for the legal and regulatory framework of the society, as well as for economic outcomes."

Culture. Informal institutions, or as we refer to it here, culture, is taken from Williamson (2009) (see also Tabellini, 2010). It measures four aspects

of culture: trust, respect, individual self-determination, and obedience. Williamson (2009: 372) writes:

> *…informal institutions are private constraints stemming from norms, culture, and customs that emerge spontaneously. They are not designed or enforced by government. The key difference between formal and informal is that informal institutions remain in the private realm, whereas formal constraints are centrally designed and enforced.*

The underlying culture data comes from the World Values Survey and European Values Survey. It is probably the newest and thus least well-known among the indicators used in this study. This variable was used recently by Harger and Hall (2015).

These six measures are attempts to measure analytically distinct dimensions of institutional quality. Democracy, for instance, speaks to the formal *process* of making collective decisions, whereas economic freedom and political freedom each speak to the *content* of those decisions, albeit in different areas of life. In principle and somewhat ironically, people could democratically elect an autocrat who wantonly impinges on their economic and perhaps some political freedoms—though replacing the rascal with another autocrat every so often in free and fair elections.

Likewise, economic freedom and political freedom need not go perfectly hand in hand. Economic freedom is about the ability to engage in trade, hire and fire, invest, and so on without interference. Political freedom (and civil liberties) is about the freedom to speak, vote, organise, and engage in various social and personal-life activities without interference. Having a high degree of one does not necessarily give you a high degree of the other. One might be left free to trade but not particularly free to criticise the government, as is the case in modern-day Singapore, or vice versa, though it is less clear if the opposite case can exist. Both Hayek (1944) and Friedman (1962) argued that combining political liberalism with economic repression was impossible, and there is evidence to support their view (Lawson & Clark 2010).

Governance is not really about either the process of collective decision-making or the content of those collective decisions; it is about the even-handedness and efficiency of the application and enforcement of the decisions, whatever they may be and however they were decided. It is conceptually possible that wildly illiberal economic and political policies, whether decided democratically or not, could be enforced fairly and evenly. The concept of the rule of law, strictly speaking, says nothing about the democracy or liberalism.

It seems clear that a centralised legal code or a decentralised common law style code could be combined with democracy, economic freedom, political

freedom or good governance or not. A culture of social trust need not necessarily be connected to any of these other facets of institutional life.

Despite reflecting distinct dimensions, empirical relationships could exist between and among these dimensions. For example, countries with more democracy are very likely to offer more political freedom and civil liberties to citizens. Additionally, democracy and political freedom appear to be among the strongest predictors of economic freedom (Lawson, Murphy & Powell; 2018). Common law countries appear to offer more economic freedom. It is probably quite difficult in practice to fairly and evenly enforce illiberal polities, so governance is likely linked to economic and political liberalism. Countries with stronger cultural norms related to social trust are probably better governed, though they may have less economic freedom in some areas (Rothstein, 2011).

If these measures of institutional quality are empirically linked, as they appear to be, despite the distinctiveness of the concepts being measured, then this presents difficult challenges for empirical researchers.

If a researcher includes political freedom in an empirical model without a measure of democracy, he or she risks attributing an effect to political freedom that perhaps should belong to democracy. Here, the problem of omitted variable bias is very real. On the other hand, we have only one world, and there is an almost limitless number of variables, institutional and otherwise, from which to choose. Including them all in any one model would quickly evaporate the available degrees of freedom, and in any case, the inevitable multicollinearity among these variables could drastically reduce the power of any statistical tests. Furthermore, it might be that these indexes measure the generic "goodness" of countries, even though they appear to be measuring different concepts (Lawson & Murphy, 2015). If these concerns are valid, we may attribute a causal relationship to a particular institutional flavour when in fact it reflects other institutional qualities, or simply the latent "goodness" of the nation.

In practice, researchers must necessarily pick their favoured institutional variable(s) and conduct empirical work while excluding their disfavoured variables. Leamer (1983) famously criticised specification searches designed to yield particular results. In a recent interview, Joshua Angrist, in discussing Leamer, stated that "the idea of pre-commitment becomes very difficult in some of the research designs that I use, where you really need to see the data before you can decide how to analyse them. You're not sure what's going to work" (Roberts 2014). However, when looking for what "works," we often end up with published research findings that are false (Ioannidis, 2005). This also affects economics (Ioannidis et al. , 2017).

In this paper, we restrict ourselves to six institutional measures; thus, we too are excluding a potentially vast number of other variables that exist. We have, however, selected them in order to get a representative variable for the

major conceptual areas in the literature: economic freedom, political freedom/civil liberties, democracy, legal structure, and culture. Table 1 summarises the six dimensions of institutions, their corresponding indicators, and their sources.

Table 1: Dimensions and Indicators of Institutions

Dimension of Institutions	**Indicator Used**	**Source**
Economic Freedom	*Freedom of the World*	Gwartney et al. (2014)
Political Freedom	*Freedom of the World*	Freedom House
Democracy	*Polity IV*	Centre for Systemic Peace
Governance	*Worldwide Governance Indicators*	World Bank
Legal Origins	British Legal Origins	La Porta et al. (1998)
Culture	Trust, Respect, Individual Self-Determination, and (Low) Obedience	Williamson (2009) Tabellini (2010)

All the variables described above have been standardised and ordered so that higher values reflect what is usually interpreted to indicate "better" institutional quality. Thus, the coefficient estimates are directly comparable in magnitude. The variables measured in levels reflect the year 2000, and any change (or growth rate) variables reflect the period from 2000-2010. A different set of years could be used, but since our focus is on a cross-section, the choice is inherently arbitrary. The years 2000 and 2010 were chosen because they were the roundest numbers (to keep in the spirit of Leamer) and because it more closely corresponded with the cultural indicator[2].

Table 2: Correlation Matrix Among Six Dimensions of Institutions in the Year 2000

	Economic Freedom	**Democracy**	**Governance**	**Political Freedom**	**Legal Origins**
Economic Freedom					
Democracy	0.478				
Governance	0.799	0.559			
Political Freedom	0.645	0.893	0.736		
Legal Origins	0.318	0.138	0.241	0.177	
Culture	0.558	0.394	0.638	0.466	0.016

Starting in the year 2000 allows the various institutional variables to be fully available with reasonable sample sizes, and ending in 2010. While panel models are common in the development literature, long-period cross-sections are also common (see, for example, Hall and Jones 1999). Table 2 provides the correlation matrix for all six indicators. The pairwise correlations between the institutional variables are uniformly positive, ranging from a low of 0.016 between legal origin and culture and a high of 0.893 between political freedom and democracy.

Leamer suggested researchers instead run models using *all* possible combinations of the variables in question and then summarise the coefficient results for each variable based on all the specifications. This is our approach here. We will employ two basic empirical models. The first specification (Equation 1) is a basic model to estimate GDP per capita, and the second (Equation 2) is a basic model to estimate economic growth rates.

$$Y_i = \alpha_0 + \alpha_1(K_i) + \alpha_2(L_i) + \alpha_k(INST_{ik}) + \varepsilon_i \quad (1)$$

$$G_i = \beta_0 + \beta_1(Y_i) + \beta_2(INV_i) + \beta_3(L_i) + \beta_k(INST_{ik}) + \beta_m(\Delta INST_{im}) + \varepsilon_i \quad (2)$$

Y_i is the log of GDP per capita in 2000, measured in PPP U.S. dollars. K_i is a measure of physical capital per worker (Baier et al., 2006), and L_i is a measure of human capital, the average years of education among those 25 years or older (Barro & Lee, 2010). These two variables are included in all specifications. $INST_{ik}$ is the set of up to k (k=6) institutional variables. Since the Leamer approach is to run all possible combinations of these variables, there are $2^6 - 1 = 63$ estimations of Equation 1. This specification is similar to the one used by Hall and Jones (1999).

G_i is the annualised rate of real economic growth from 2000-2010. INV_i is the average amount of investment (i.e., gross capital formation) expressed as a share of GDP during 2000-2010. Y_i, L_i, and $INST_{ik}$ are the same as in Equation 1.[3] $\Delta INST_{im}$ is a set of up to m (m=4) variables reflecting the change in the institutional measure between 2000 and 2010.[4] Y_i, INV_i, and L_i are included in all specifications. The level and change versions of each institutional variable were paired so that if one was included, then the other was included. Thus, there are also 63 estimations of Equation 2. This specification is similar in structure to the one used by Gwartney et al. (2006).

Table 3 provides a table of descriptive statistics for all of the variables used in Equations 1 and 2. Note that since all of the institutional variables have been standardised, the means and standard deviations are always 0 and 1 respectively.[5]

Table 3: Descriptive Statistics (Data Correspond to the Year 2000)

Variable	Obs	Mean	Std	Min	Max
Log RGDP per Capita, PPP	121	8.87	1.29	6.16	11.59
RGDP per Capita Annualised Growth	121	0.024	0.022	-0.063	0.099
Standardised Human Capital	121	0	1	-1.95	1.95
Standardised Capital per Worker	121	0	1	-0.97	2.66
Standardised Invest., % of GDP	121	0	1	-2.71	3.73
Standardised Democracy	120	0	1	-2.36	0.99
Standardised Diff. Democracy	120	0	1	-3.30	3.51
Standardised Economic Freedom	103	0	1	-2.46	2.01
Standardised Diff. Economic Freedom	103	0	1	-3.56	2.86
Standardised Governance	95	0	1	-1.70	1.84
Standardised Diff. Governance	95	0	1	-2.24	2.55
Standardised Political Freedom	120	0	1	-2.01	1.25
Standardised Diff. Political Freedom	120	0	1	-3.06	2.64
Standardised Legal Origins	121	0	1	-0.43	2.31
Standardised Culture	72	0	1	-2.07	2.63

3. Results

Table 4 reports on two baseline empirical specifications that include only the control variables as independent variables without institutional variables. These specifications are akin to the Mankiw, Romer, and Weil model (1992), which predicts national output and growth in an input-output context. In the first regression, using the log of GDP per capita as the dependent variable, we find that the levels of human capital and physical capital are positively and significantly related to income. Likewise, in the second regression, using annualised growth as the dependent variable, we find investment and human capital are positive and significant, and the log of GDP per capita at the beginning of the period is negative and significant. These are standard empirical findings consistent with our theoretical expectations. What

interests us is what happens when various combinations of institutional variables are added to the mix.

Table 4: Cross-Sectional Results Using Baseline Mankiw, Romer, and Weil Model

	Log Real GDP Per Capita, PPP (2000)	**Annualised RGDP Per Capita, PPP Growth (2000-2010)**
Standardised	0.335***	1.031***
Human Capital	(0.070)	(0.234)
Standardised	0.907***	
Physical Capital	(0.070)	
Standardised		0.987***
Investment		(0.162)
Log Real GDP		-1.130***
Per Capita, PPP		(0.002)
Constant	8.866***	12.465***
	(0.052)	(1.606)
Adjusted R^2	0.804	0.383
n	121	121

*denotes *p<0.10.*
** denotes *p<0.05*.
*** denotes *p<0.01*.

Before summarising the results, it is worth emphasising the difficulty of the Leamer specification approach. For each model, we will have run 63 regressions using various combinations of the six institutional variables, which are all highly correlated with each other. Among the level variables, the variance inflation factor is 4.25, and among the level and change variables, it is 7.83. Given this high degree of multicollinearity and the relatively small sample sizes (note, we are not using a panel to increase our sample size as is common in the literature), it would be surprising if any of these variables reported statistically significant coefficients in more than a handful of regressions. Bear in mind, however, that multicollinearity does not bias the alpha (or beta) coefficients of the institutional measures; it affects only the precision of the estimators. Thus, if a variable truly influences the dependent variable, we would at least expect the signs of the coefficients to be in the expected direction, even if we fail to achieve statistical significance in each case. We still report regarding the frequency with which statistical significance is achieved for each variable since that is additional information relevant to the question of robustness.

Table 5 initially presents each of the institutional measures alone in a regression using log of GDP per capita as the dependent variable with the

two control variables. The control variables perform again as expected. Among the institutional variables, in contrast, only the economic freedom variable is statistically significant with the expected positive sign. Democracy and legal origins, though insignificant, have negative signs. Varying sample sizes are driven by differences in data coverage; the cultural variable only has 72 observations, although the sample includes a reasonable mix of both developing and developed countries.[6]

Table 5: Baseline Regressions for Each Dimension of Institutions, Logged GDP Per Capita as Dependent Variable (Year 2000)

	Economic Freedom	**Democracy**	**Governance**	**Political Freedom**	**Legal Origins**	**Culture**
Dimension of Institutions	0.130* (0.072)	-0.001 (0.060)	0.044 (0.079)	0.061 (0.064)	-0.070 (0.053)	0.023 (0.085)
Human Capital	0.437*** (0.073)	0.325*** (0.076)	0.309*** (0.078)	0.299*** (0.075)	0.345*** (0.070)	0.198** (0.094)
Capital Per Worker	0.693*** (0.077)	0.930*** (0.072)	0.767*** (0.078)	0.917*** (0.073)	0.915*** (0.070)	0.835*** (0.090)
Constant	8.930*** (0.049)	8.872*** (0.052)	9.025*** (0.054)	8.872*** (0.052)	8.866*** (0.052)	9.005*** (0.070)
Adjusted R^2	0.846	0.802	0.813	0.804	0.805	0.788
n	103	120	95	120	121	72

*denotes p<0.10.
** denotes p<0.05.
*** denotes p<0.01.

Table 6 presents summary statistics for the alpha coefficients and accompanying t-statistics for the 63 regressions described in Equation 1, using log of GDP per capita as the dependent variable. As expected, both the physical capital and human capital variables, which were included in all specifications, were strongly positive and significant across the 63 estimations. Every single alpha coefficient was greater than zero. Physical capital was significant in 100% and human capital in 78% of the regressions. On average, a one standard unit higher level of physical capital corresponds to 1.28 standard units of additional income. Human capital was less potent, but here a one standard unit higher level is associated with about a half of a standard unit in higher income.

Table 6: Results, Predicting Levels of Logged GDP Per Capita, Year 2000

Variable	Mean	Std	Min	Max	CDF*
Controls					
Human	alphas:0.279	0.091	0.134	0.455	1.00
Capital	*t*-stats:3.322	1.357	1.31	6.18	0.78
Capital	alphas:0.716	0.108	0.491	0.933	1.00
per Worker	*t*-stats: 8.143	2.080	4.74	13.14	1.00
Institutions					
Economic	alphas: 0.052	0.081	-0.098	0.181	0.74
Freedom	*t*-stats:0.654	1.001	-1.12	2.37	0.16
Democracy	alphas:0.019	0.118	-0.207	0.278	0.53
	t-stats:0.126	1.127	-1.75	2.22	0.06
Governance	alphas: 0.211	0.097	0.044	0.407	1.00
	t-stats: 0.126	0.716	0.56	3.16	0.44
Political	alphas: -0.026	0.131	-0.281	0.257	0.38
Freedom	*t*-stats: -0.147	1.104	-1.91	2.04	0.03
Legal	alphas: -0.083	0.021	-0.119	-0.050	0.00
Origins	*t*-stats: -1.729	0.056	-2.81	-0.9	0.00
Culture	alphas: -0.039	0.053	-0.118	0.034	0.47
	t-stats: -0.544	0.732	-1.55	0.44	0.00

*CDF of alphas greater than zero and *t*-statistics greater than 1.96.

Among the institutional variables, the results were uneven. Economic freedom, democracy, and governance were positively related to income 74%, 54%, and 100% of the time, but were significant only 16%, 6%, and 44% of the time, respectively. Political freedom was positive and significant only 3% of the time. Legal origins and culture were never positive and significant. Political freedom, legal origins, and culture were negative on average.

Among the three top performers, a one standard unit higher level of the indicators of economic freedom, democracy, and governance, were consistent with 0.10, 0.03, and 0.38 higher levels of income in standardised terms. Even in the best cases, the impacts of the dimensions of institutions pale in comparison to those of the core control variables[7].

Table 7 presents the summary statistics for the beta coefficients and *t*-statistics from the 63 growth regressions described by Equation 2. Again, the core control variables perform as expected. The initial level of income is negatively and significantly related to growth over the decade in every regression—this is consistent with conditional convergence. Investment was positive and significant 100% of the time and human capital was positive and

significant 87% of the time. One standard unit higher magnitude for each of these variables corresponded to -0.54 (for initial income), +0.41 (for human capital), and +0.44 (for investment) in standard units of economic growth.

Table 7: Results, 10-Year Growth Rates, 2000-2010

Variable	Mean	Std	Min	Max	CDF*
Controls					
Log RGDP	betas: -1.18%	0.17 %	-1.42%	-0.08%	0.00
PC, PPP	*t*-stats:-4.318	1.080	-6.41	-2.58	0.00
Human	betas:0.91 %	0.23%	0.38%	0.12%	1.00
Capital	*t*-stats: 3.073	0.893	1.15	4.52	0.87
Investment	betas:0.96 %	0.17%	0.69%	1.28%	1.00
	t-stats: 5.399	0.958	3.67	7.04	1.00
Institutions					
Economic	betas:0.35 %	0.18%	0.05%-	0.68%	1.00
Freedom	*t*-stats: 1.128	0.626	0.14	2.3	0.09
Differenced	betas:0.59 %	0.18%	0.27%	0.79%	1.00
Ec. Freedom	*t*-stats: 2.595	0.900	1.05	3.72	0.75
Democracy	betas:0.13 %	0.30 %	-0.36%	0.69%	0.63
	t-stats: 0.143	0.825	-1.35	1.23	0.00
Differenced	betas: -0.18%	0.08%	-0.37%	0.02%	0.03
Democracy	*t*-stats:0.002	0.000	0.002	0.003	0.00
Governance	betas: -0.36%	0.25%	-1.09%	0.04%	0.06
	t-stats: -0.956	0.658	-2.7	0.11	0.00
Differenced	betas: -0.07	0.12%	-0.22%	0.15%	0.25
Governance	*t*-stats: -0.308	0.623	-1.13	0.83	0.00
Political	betas: -0.40%	0.29%	-0.92%	0.12%	0.13
Freedom	*t*-stats: -0.973	0.642	-1.84	0.48	0.00
Differenced	betas:0.09%	0.18%	-0.16%	0.36%	0.63
Pol. Freedom	*t*-stats:0.477	0.847	-0.82	1.71	0.00
Legal	betas: -0.01	0.03%	-0.07%	0.05	0.44
Origins	*t*-stats:0.080	0.237	-0.53	0.42	0.00
Culture	betas: -0.11%	0.10%	-0.29%	0.07%	0.16
	t-stats: -0.473	0.409	-1.2	0.33	0.00

*CDF of betas greater than zero and t-statistics greater than 1.96.

Turning to the dimensions of institutions, we find significant results only for the indicator of economic freedom. While the level of economic freedom was positive and significant in only 9% of the runs, the change in economic freedom was 75% of the time. A one standard unit greater change in economic freedom is associated with a 0.27 standardised unit higher level of

growth. None of the other variables are positive and significant in a single specification.

This analysis was replicated using panel data for years 2000 and 2002-2010 with analogous specifications inclusive of year and country fixed effects and controls for physical and human capital[8]. Economic freedom, democracy, governance, and political freedom dictated which years were employed, while legal origins and culture were not included as they would be subsumed into the country fixed effects. The results of this exercise are found in Appendix A. These results are remarkably similar to those found in the simple cross-section. Governance predicts levels of income most effectively, with economic freedom a distant second, while economic freedom best predicts growth. In these regressions, political freedom and democracy do not perform well. Adding some degree of identification by using panel methods seems to support our primary findings, although it must be emphasised that the ways in which panel methods could be employed are myriad.

4. Conclusion

Leamer (1983) implicitly accused econometric researchers of using specification searches, consciously or unconsciously, to get the results they want. Here we looked at six indicators of institutional quality, each of which corresponds to a different dimension of institutions. Our two models estimating income and growth held constant the basic specification; that is, we did not allow for ad hoc inclusion or exclusion of random control variables nor did we allow for ad hoc selection of different periods or the use of panel methods. Additionally, per Leamer, our estimation strategy was to include and exclude all possible combinations of the explanatory institutional variables.

In the income regressions, only the indicators representing governance, economic freedom, and perhaps democracy performed reasonably well. Governance was significant 44%, economic freedom 16%, and democracy 9% of the time. The other three institutional variables' coefficients were negative on average. It was no better for the growth regressions, where only economic freedom, more specifically the change in economic freedom, performed as expected; it was impressively positive and significant in 75% of the estimations. These qualitative findings are largely supported in one application of panel methods to the same set of variables (setting aside legal origins and culture). In light of the strictness of these estimation strategies, we are prepared to conclude that countries with improvements in economic freedom are likely to experience faster rates of economic growth, although

we do not claim that the models are well-identified, and discussions of causality must be stated very weakly.

Any casual survey of the literature can find examples of these variables, and others like them being reported with positive and significant coefficients in income and growth regressions. Our overall conclusion is that specification search methods may be accountable for many of these results. While we believe it is not warranted to conclude that institutions do not matter, we do find some support for Leamer's criticism.

Notes

1. Extreme Bounds Analysis differs slightly from is performed here, instead reporting the most extreme coefficient estimates following the inclusion or exclusion of a series of control variables. See also Granger and Uhlig (1990).
2. The culture variable by Williamson (2009) reflects the mid to late 1990s.
3. There appears to be no analog to physical capital investment on the human capital side in the empirical literature. It is common to run both income and growth regressions using the level of human capital as an independent variable. Also, there is some debate about the appropriateness of using levels and change measures of institutions in growth regressions (de Haan et al., 2006). Here we use both as advocated by Lawson (2006).
4. The Legal Origins and Culture variables do not vary over time so there is no differenced version for these variables.
5. Note than in any given specification, because sample sizes will vary, the sample mean and standard deviation may not be 0 and 1 respectively.
6. In addition to high income countries, the culture indicator is available for low and middle income countries such as Algeria, Armenia, Bangladesh, Brazil, China, Colombia, Egypt, El Salvador, Ghana, India, Indonesia, Iran, Iraq, Jordan, Kyrgyz Republic, Mali, Moldova, Morocco, Pakistan, Peru, The Philippines, Rwanda, Thailand, Uganda, Ukraine, Venezuela, Vietnam, Zambia, and Zimbabwe. The culture indicator performs to poorly, as we shall see, with a negative point estimate, that sampling concerns with this variable may be minimal.
7. The impact of institutions may be much greater if they channel their impact through increases in capital (Gwartney et al., 2006).
8. In these regressions, data on physical and human capital originated from Penn World Table (Feenstra et al. 2015).

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Appendices

Appendix 1: Panel Results, Levels of Income

Variable	Mean	Std	Min	Max	CDF*
Controls					
Human	alphas:0.136	0.016	0.113	0.167	1.00
Capital	*t*-stats:1.558	0.157	1.32	1.86	0.00
Capital	alphas:0.577	0.018	0.547	0.603	1.00
per Worker	*t*-stats:7.372	0.329	6.98	7.84	1.00
Institutions					
Economic	alphas: 0.045	0.007	0.034	0.053	1.00
Freedom	*t*-stats: 1.619	0.209	1.29	1.84	0.00
Democracy	alphas: -0.016	0.006	-0.022	-0.004	0.00
	t-stats: -0.770	0.303	-1.09	-0.22	0
Governance	alphas:0.136	0.038	0.092	0.184	1.00
	t-stats:2.816	0.777	1.94	3.66	0.875
Political	alphas:0.006	0.024	-0.023	0.043	0.50
Freedom	*t*-stats:0.213	0.739	-0.700	1.350	0.00

*CDF of alphas greater than zero and *t*-statistics greater than 1.96.

Appendix 2: Results, One Year Growth Rates

Variable	Mean	Std	Min	Max	CDF*
Controls					
Log RGDP	betas: -2.526	0.123	-2.715	-2.337	0.00
PC, PPP	*t*-stats: -7.794	0.312	-8.16	-7.18	0.00
Human	betas: -0.014	0.010	-0.026	0.007	0.133
Capital	*t*-stats: -0.539	0.363	-0.96	0.21	0.00
Capital	betas:0.281	0.018	0.253	0.307	1.00
per Worker	*t*-stats:5.307	0.664	4.55	6.17	1.00
Institutions					
Economic	betas:0.339	0.054	0.268	0.424	1.00
Freedom	*t*-stats:2.108	0.173	1.86	2.41	0.875
Democracy	betas: -0.018	0.021	-0.050	0.008	0.125
	t-stats: -0.138	0.160	-0.40	-0.06	0.00
Governance	betas:0.246	0.166	0.028	0.428	1.00
	t-stats:0.883	0.677	0.07	1.64	1.00
Political	betas: -0.036	0.038	-0.092	0.019	0.250
Freedom	*t*-stats: -0.284	0.301	-0.72	0.17	0.00

*CDF of betas greater than zero and *t*-statistics greater than 1.96.