

# Cultural Values and Economic Growth: A New Look at Past Findings

Jonathan K. Hanson  
Gerald R. Ford School of Public Policy  
University of Michigan

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## **Abstract**

Although many scholars, most famously Weber, have attributed differences in rates of economic development across countries to the presence or absence of key cultural values, few have tried to test these predictions systematically. One exception is Grant, Inglehart, and Leblang (1996), who use data from the 1990 wave of the World Values Survey to measure the level of "achievement motivation" in a set of 25 countries. This variable is the key explanatory factor in an economic growth model that covers the period 1960-1989, and it is claimed to have a strong, positive effect on the rate of growth. Since the achievement motivation scores come after the period of economic performance under study, however, the extent to which these values can be seen as causal is in doubt. Taking advantage of the passage of time, this paper tests the effect of these same measurements of achievement motivation on economic growth in the period 1991-2008, thus permitting a more telling test of the predictive power of these cultural values on future economic growth. Additional tests are performed using broader sample of countries. The new tests find that achievement motivation is not a significant predictor of economic growth.

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The idea of a man's duty to his possessions, to which he subordinates himself as an obedient servant, or even as an acquisitive machine, bears with chilling weight on his life. The greater the possessions the heavier, if the ascetic attitude toward life stands the test, the feeling of responsibility toward them, for holding them undiminished in the glory of God and increasing them by restless effort. The origin of this type of life also extends in certain roots, like so many aspects of the spirit of capitalism, back into the Middle Ages. But it was in the ethic of Protestantism that it first found a consistent ethical formulation. Its significance for the development of capitalism is obvious.

– Max Weber, *The Protestant Ethic and the Sprit of Capitalism*

In the time since Weber, many scholars have attributed differences in the rates of economic development across countries to the presence or absence of key cultural values (McClelland et al., 1953; McClelland, 1961; Landes, 1998). Few have tried to test these predictions systematically, however. One exception is Granato, Inglehart, and Leblang (1996), who use data from the 1990 wave of the World Values Survey to measure the level of "achievement motivation" in a set of 25 countries and employ this variable in an endogenous growth regression model. They find that this cultural characteristic is a robust predictor of the rate of economic growth.

As has been the case with other scholarship that ascribes explanatory power to culture, the work of Granato et al. (1996), hereinafter GIL, has been the subject of contentious debate. In fact, two articles critiquing GIL appeared alongside it in the same issue of the *American Journal of Political Science*. In one, Jackman and Miller (1996a) describe the methodological procedures in GIL as "fatally flawed," since achievement motivation is measured at the end of the period of time during which the rate of economic growth is measured, rather than at the beginning. In the other article, Swank (1996) argues that greater attention should be given to the causal role of institutions in facilitating and reinforcing cultural values. After controlling for "communitarian" institutional forms, the statistical correlation between achievement motivation and growth disappears.

The passage of time has made new data available, thus permitting a much more thorough examination of the original claims in GIL. This paper replicates the approach in GIL using the original sample,<sup>1</sup> finding that there is no statistical relationship between achievement motivation in 1990 and the rate of economic growth in the 17-year period beginning in 1991. Additionally, this study expands the size of the sample to include 17 countries that were part of the 1990 wave of the World Values Survey but could not be included in the analysis by GIL. Tests in this expanded sample again find no relationship between achievement motivation and subsequent economic growth.

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<sup>1</sup>Replacing the unified Germany for West Germany.

The next section provides a fuller description of the original work by GIL and presents some competing perspectives on the role of culture in political and economic processes. Section 2 describes the procedures followed in this paper, and the subsequent section presents the results of these analyses. Section 4 concludes.

## 1 Achievement Motivation and Growth

GIL argue that both economic and cultural factors matter for explaining economic growth. They do not claim, in other words, that cultural values take precedence over traditional economic factors, but they maintain that culture is fundamentally part of the story. They define culture as a “system of common values that help shape the behavior of the people in a given society” (1996: 608). In particular, they focus on values that affect the motivation of individuals to pursue individual economic accumulation.

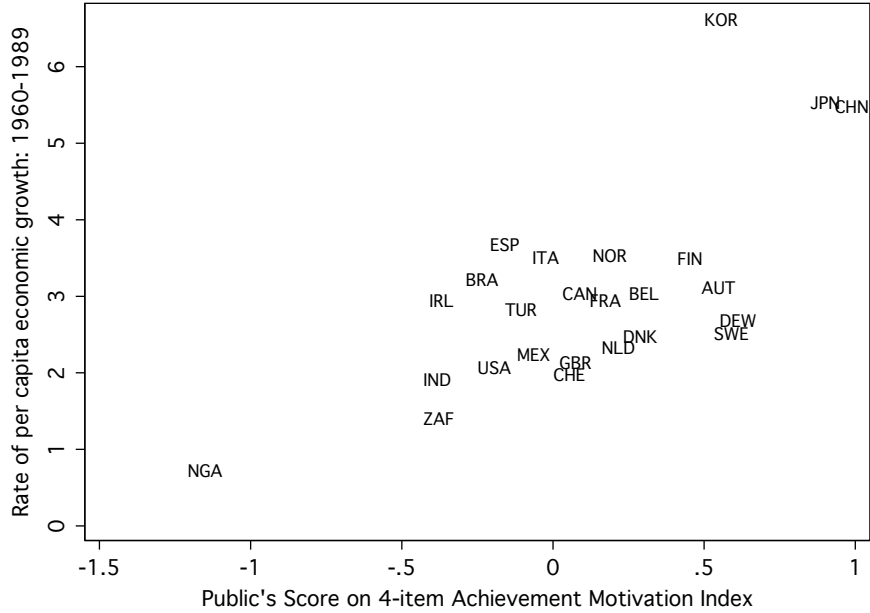
GIL regard the work of Weber (1958) as foundational. As they argue, the Protestant Reformation was an important instance of a more general phenomenon in which “norms that inhibit economic achievement” and upward social mobility are removed (1996: 610). Preindustrial cultures, they argue, were hostile to social mobility and profit-making, but the Protestant Reformation created values that supported individual achievement and thus laid the basis for industrialization and growth. Yet, the rise of these values is not limited to Protestant countries. Wherever these values emerge, such as in modern Confucian societies, faster rates of economic growth are expected to follow.

A second important influence on GIL is the work of McClelland et al. (1953) and McClelland (1961), which introduces the concept of achievement motivation. This research found that societies that emphasize values of economic achievement grew faster. One shortcoming, however, was that McClelland had to measure achievement motivation through a content analysis of school textbooks rather than directly measure the prevalence of this value in society at large. The extent to which these values were salient among the populations of the respective countries, therefore, is not clear.

Compared with this earlier work, there are two main innovations in GIL. The first is the use of representative national surveys to measure cultural values directly rather than infer them from school materials, subjective impressions, or even worse, from observed economic performance. Their data come from the 1990 wave of the World Values Survey, which was conducted in 43 societies. From these surveys come two key cultural characteristics: achievement motivation and postmaterialism.

In an effort to improve upon McClelland’s method, the achievement motivation index in GIL is derived from the percentage of survey respondents that emphasize

**Figure 1: Economic Growth by Achievement Motivation (original)**



values of “thrift” and “determination” over those of “obedience” and “religious faith.” Post-materialism, on the other hand, measures the extent to which respondents prioritize self-government and self-expression over concerns about order and rising prices. This latter variable comes out of the work of Inglehart (1977, 1990), which posits that there is a shift in values in wealthy societies where material concerns become relatively less pressing than other quality of life concerns. GIL regard the shift to postmaterialist values as something akin to the “rise of the Protestant Ethic in reverse” (1996: 613), thus slowing the rate of economic growth.

Figure 1 recreates the scatterplot presented in GIL of the 1960-1989 growth rates of GDP per capita on country achievement motivation scores using the original data. The bivariate relationship between these variables is strongly positive ( $r = .66$ ;  $p = .001$ ).

The second innovation in GIL is the inclusion of the cultural variables in a standard endogenous growth regression model, thus permitting comparison of their results with a plethora of other studies. In these tests, which are replicated in the Appendix using the original data (Table 4), the dependent variable is the mean rate of growth in GDP per capita in the period 1960-1989. On the right-hand side, the key economic variables are those identified in Levine and Renelt (1992) as having robust partial correlations with economic growth: the initial level of per capita income, elementary and secondary school enrollment levels (proxies for

human capital), and the rate of investment. GIL employ a range of statistical tests to determine whether either the standard economic model or the cultural values model encompasses the other and to test the robustness of the cultural variables.

They find that achievement motivation is a strong, robust predictor of economic growth that explains some of the variation in economic growth rates across countries that standard economic variables cannot. Postmaterialism, on the other hand, does not survive the robustness testing procedures. The resulting “parsimonious” model of economic growth (Model 4) includes achievement motivation alongside the initial level of GDP per capita and primary school enrollment levels. Notably, this model does not include the rate of investment, which ceased to be statistically significant once achievement motivation was included in the equation. They conclude, accordingly, that cultural explanations of economic growth should no longer be treated separately from economic explanations.

## 1.1 Critiques

Jackman and Miller (1996a) criticize the the GIL approach on both theoretical and empirical grounds. In terms of the theory, they argue that Weber drew incorrect inferences about the importance of the rise of Protestantism for modernizing Europe by mistaking the effect of the recovery from the Black Death of the late 14th century for new forms of economic activity driven by the rise of Calvinist theology (1996a: 699). If Weber was wrong, the foundations of the theory in GIL are weakened.

The empirical critique, however, is of greater concern in this paper. Jackman and Miller (1996a) take GIL to task for the fact that the measure of achievement motivation comes after the period of economic performance in question. Specifically, achievement motivation in 1990 is described by GIL as a significant *predictor* of economic growth during the *previous* 29 years. This procedure would be valid if levels of achievement motivation were stable over time, making the 1990 measurements a close approximation of their 1960 counterparts, but this validity evaporates if economic performance affects the prevalence of achievement motivation values.

As Jackman and Miller state, it could be that “economic growth creates a climate where norms favoring saving and ‘determination’ make sense” (1996a: 702). Similarly, Porter argues, “National characteristics ascribed to culture . . . often have economic roots” (2000: 24) To the extent that these claims are true, the statistical relationship that GIL identify should be interpreted very differently. Since GIL state elsewhere in the article that cultures can change, and that there is an endogenous relationship between at least some cultural values and economic growth, there is strong reason to be skeptical that levels of achievement motivation were stable between 1960 and 1990 in these 25 countries.

Jackman and Miller attempt to address this shortcoming by replicating the model in GIL but instead using McClelland's measure of achievement motivation drawn from content analysis of school materials in 1950. The economic variables are the same as those used in GIL. They find that the McClelland achievement motivation variable is not statistically significant in the growth regression. Although this procedure corrects the temporal problem in the GIL approach, 10 of the 25 cases are lost due to lack of data. Additionally, as stated above, the McClelland data does not measure the extent to which these values are actually present in society. Accordingly, there is reason to take another look at this question.

An equally powerful empirical criticism from Jackman and Miller is that the four elements that comprise the GIL achievement motivation index – thrift, determination, obedience, and religious faith – do not constitute a coherent cluster of characteristics within the samples of the 25 countries included in the analysis. Instead, they find through factor analysis that two separate factors are identified from these four elements in 17 of the 25 countries. If these characteristics do not cluster within individuals, we should not use them to make broader claims about political culture (1996a: 706).

These findings demonstrate the validity of the concerns set forth by Seligson (2002), who warns that using aggregated survey responses raises the risk of the ecological fallacy. Measuring achievement motivation at the national level can mask what is happening inside the distribution of survey responses. More troubling, across countries, we can observe correlation between these aggregate values and other country-level variables even when no such correlation exists inside the individual country units. As an illustration, the fact that there is a high rate of growth and a high level of achievement motivation in South Korea, and the opposite in Nigeria, does not mean that either individual South Koreans or Nigerians who score high on achievement motivation have faster income growth than those who score low.

According to Johnson (2003), the lack of a clear mechanism to connect individual-level cultural values with aggregate economic or political outcomes is a problem common to political culture research. Johnson argues that this research has become "driven by technique" (2003: 97). The availability of survey data has made it relatively easy to describe the beliefs of a population in the aggregate, but the conceptual question of whether these distributions of beliefs constitute culture in any meaningful sense has been shunted to the side. Additionally, it has become common to gloss over the process of how these values translate into actions that produce political and economic outcomes.

One study that does give some attention to such mechanisms is that of Swank (1996), who argues that values that emphasize collective organization and societal consensus are reinforced or facilitated by the institutions of "communitarian" polities. Communitarian institutions, specifically the Confucian statist institutions

of the post-war era and the social corporatist institutions of Western Europe, help overcome collective action problems and promote societal consensus. Swank replicates the analysis in GIL, adding dummy variables to represent Confucian statist and social corporatist institutions.<sup>2</sup> He finds that the coefficients on Achievement Motivation and Postmaterialism are not significant when these variables are included. The shortcoming of this approach, as noted by Jackman and Miller (1996a), is that these country groups could be given any number of arbitrary labels, and we cannot just choose a label that fits a favorite theory.<sup>3</sup>

These criticisms raise significant questions regarding the clarity of the concept of political culture as well as the validity of the achievement motivation index in particular. These questions are beyond the scope of this paper, which addresses the more limited matter of whether achievement motivation remains a significant predictor of economic growth in more appropriate statistical tests. Accordingly, even if the GIL findings can be replicated using newer data, there remain reasons to be skeptical.

## 2 Research Design

Taking advantage of the passage of time, the analysis presented in this paper improves upon the empirical tests in GIL in two major ways. First, it tests whether the cultural characteristics measured in the 1990 wave of the World Values Survey are predictive of economic growth in the period of time subsequent to the survey. Second, it expands the sample of countries from 25 to 42. Each of these improvements is discussed in more detail below.

More than a decade has passed since the GIL article was published, and nearly two decades have passed since the key cultural values data were collected. Employing the most-recent economic data available, this paper replicates the statistical tests in GIL for the period 1991-2008. Although this 17-year period is shorter than the period of time covered in the original analysis, it should be adequate to provide a good estimate of the long-run effects of the cultural variables, if any. In this way, the analysis in this paper addresses the temporal concerns raised by Jackman and Miller. The key question is whether achievement motivation is predictive of what happens later, rather than before.

The economic data in GIL come from Levine and Renelt (1992), including the following variables: the growth rate of real per capita GDP from 1960-1989, the

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<sup>2</sup>The former category includes Japan, South Korea, and China. The latter category includes Austria, Denmark, Finland, Norway and Sweden.

<sup>3</sup>For example, a dummy variable representing countries with high levels of chopstick usage would be just as powerful as the "Confucian Statist" variable. We simply do not know what underlies the causal effect.

1960 level of primary and secondary school enrollment, and the average ratio of real domestic investment to GDP during the period 1960-1989. To recreate these data for the 1991-2008 time period, I used data from the World Bank (2009) and Heston et al. (2006). The growth rate, *Growth*, is calculated using the value of GDP per capita (PPP) in constant 2005 international dollars.<sup>4</sup> The gross level of school, *Primary Enrollment* and *Secondary Enrollment*, come from 1991.<sup>5</sup> As in GIL, these data are measured as the ratio of total enrollment to the size of the population in the relevant age group. Finally, the average investment ratio, *Investment Rate*, comes from Heston et al. (2006), and it covers the period 1991-2007.

In the replication using the 25-country sample, I follow the same set of procedures adopted in GIL in order to determine if the same findings hold for the 1991-2007 time period. These procedures include separate regressions on the economic and cultural models, a regression on the sets of economic and cultural variables combined into a single model, and tests to determine whether each model encompasses the other. For these tests, data on the cultural variables *Achievement Motivation* and *Postmaterialism* are taken from the appendix in Granato et al. (1996).

The 1990 wave of the World Values Survey covered 43 “societies,” a term that counts East Germany, West Germany, Northern Ireland, Moscow and Russia as separate. The 25-country sample in GIL did not include countries under the former Soviet umbrella, including Russia, due to unreliable economic data for the 1960-1989 period. Newer economic data covering the 1991-2007 time period thus makes it possible to expand the sample to cover Belarus, Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russia, Slovakia and Slovenia. A unified Germany, using the combined cultural values scores from 1990, replaces West Germany in the GIL sample. This paper also includes five countries that were not included in the GIL sample for unclear reasons: Argentina, Chile, Iceland, Malta, and Portugal. Altogether, the broader sample used in this paper includes 17 additional countries, including every country that was part of the 1990 wave of the World Values Survey.

In the broader 42-country sample, Achievement Motivation was calculated from the World Values Survey four-wave integrated data file (European Values Study Group and World Values Survey Association, 2006) using the formula described in GIL.<sup>6</sup> The Postmaterialist index is included in the survey data. Once again, the same set of statistical tests is implemented.

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<sup>4</sup>Specifically,  $Growth = 100 \cdot [\ln(GDPcap_{08}) - \ln(GDPcap_{90})]/17$ . Growth data for Malta cover the 1991-2006 time period.

<sup>5</sup>The exception is Slovakia, which comes from 1993 due to missing data.

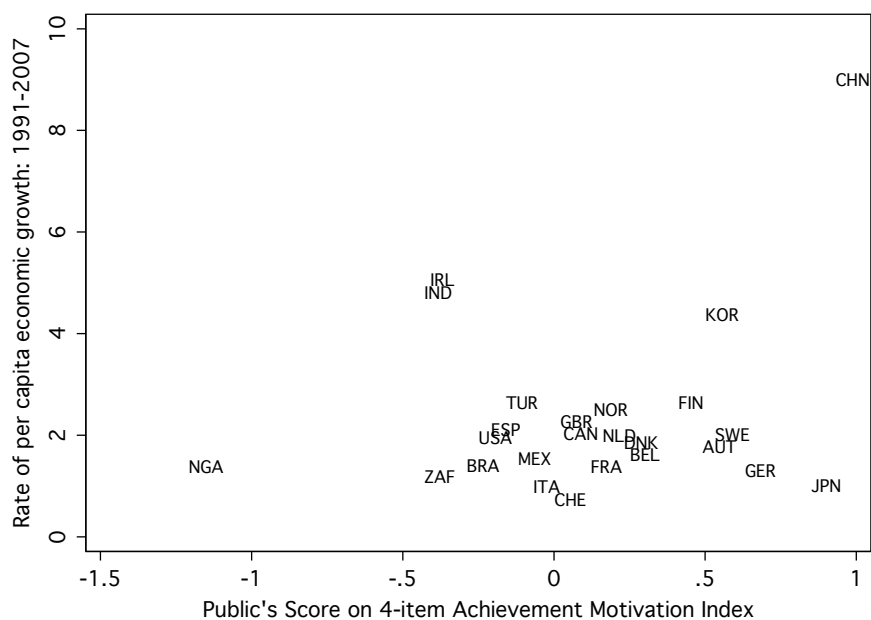
<sup>6</sup>This procedure provided achievement motivation data for every country but Switzerland, for which one of the component questions was not asked in the 1990 wave. The achievement motivation value for Switzerland thus comes from the data appendix in GIL.



### 3 Empirical Analysis

A preliminary look at the relationship between the achievement motivation scores and growth in GDP per capita during the 1991-2006 is provided in Figure 2. This scatterplot can be compared with Figure 1 above, which replicates the figure presented in GIL (p. 612). It is readily apparent that the relationship between the two variables is weak, though still positive ( $r = .23$ ;  $p = .277$ ). The outlying observation of China, moreover, drives this result. When omitting China from the sample, the correlation coefficient is negative ( $r = -.14$ ;  $p = .505$ ). Multivariate tests, like those in GIL, will control for other important factors.

**Figure 2: Economic Growth (1990-2008) by Achievement Motivation**



The first set of regression equations, shown on Table 1, uses the 25-country sample studied in GIL, except that the unified Germany replaces West Germany.<sup>7</sup> The same model specifications are tested, with the exception of Model 4 in GIL. The first of these tests, Model 1, is the baseline endogenous growth model with initial per capita GDP in 1991. Model 2 regresses the growth rate on only a constant and the cultural variables: Achievement Motivation and Postmaterialism. Model 3 includes both the economic and cultural variables in a combined model.

<sup>7</sup>Repeating the tests after omitting Germany from the sample produces no change in the substance of the results.

Specification tests then indicate that Model 1, rather than fourth model in GIL, offers the most parsimonious approach.

In terms of their substantive effects, the coefficients in Model 1 are very similar to the corresponding estimates in GIL. The negative coefficient on the initial level of GDP per capita (-2.11) indicates that the rate of growth declines in country wealth, a finding of convergence across countries that is commonplace in growth regressions. Likewise, growth is predicted to be faster where the education variables, Primary Enrollment and Secondary Enrollment, are higher. For example, an increase in the 1991 level of secondary school enrollment by 10% is associated with an annual growth rate that is .35 percentage points higher on average. The rate of investment, unsurprisingly, also has a positive effect on the growth rate. Each 10% increase in the investment rate is expected to produce an increase in the growth rate by .89 percentage points.

**Table 1: OLS Estimation of Economic Growth, 1991-2008 (25 countries)**

	(1)	(2)	(3)
Per capita GDP in 1991	-2.11** (0.33)		-2.16** (0.41)
Primary Enrollment	6.73** (2.36)		6.72* (2.80)
Secondary Enrollment	3.49* (1.39)		3.29^ (1.60)
Investment Rate	8.90** (2.97)		9.04* (3.78)
Achievement Motivation		1.17^ (0.60)	0.10 (0.56)
Postmaterialism		-5.11** (1.26)	0.43 (1.68)
Constant	10.50** (3.50)	12.18** (2.44)	10.30* (4.33)
N	25	25	25
R <sup>2</sup> Adjusted	0.77	0.41	0.74
SEE	0.84	1.35	0.89
BIC	-7.59	11.90	-1.28

^  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$

Ordinary Least Squares (standard errors in parentheses).

The findings in Model 2 are also similar to those in GIL. Where GIL found a strong and positive association between Achievement Motivation and economic

growth, this paper finds a weaker, but still positive, relationship. The coefficient of 1.17 indicates that an increase in Achievement Motivation by one standard deviation (.466) is predicted to produce an increase in the annual growth rate by .55 percentage points. Similarly, postmaterialist values are associated with slower economic growth, a finding that is consistent with the expectations of GIL. One should note, however, that since Model 2 does not control for initial GDP per capita, the coefficient on Postmaterialism is likely due to omitted variable bias. The fact that the coefficient on Postmaterialism is not distinguishable from zero in Model 3, which includes the 1990 level of GDP per capita, confirms these suspicions.<sup>8</sup>

GIL perform tests to determine whether either Model 1 or Model 2 encompasses the other. In these tests, GIL use the notation Model 1  $\xi$  Model 2 to mean “Model 1 encompasses Model 2.” Both tests are repeated here. First, GIL employ a JA-Test. The vector of predicted values of the dependent variable from Model 2 is included as a regressor in Model 1 and vice-versa. If the coefficient on the predicted values from Model 2 is statistically significant when included in Model 1, then we reject the null hypothesis that Model 1 encompasses Model 2. Secondly, GIL combine the sets of economic and political variables into a single model. They perform joint F-tests to determine whether restricting either set of coefficients to zero alters the sum of squared errors significantly compared to the full model. If such a restriction has a significant effect, as shown by the F statistic, then we can reject the null hypothesis that the restricted model is encompassed by the unrestricted model.

**Table 2: Encompassing Tests**

Model 1 $\xi$ Model 2	Form	Test	Form	Model 2 $\xi$ Model 1
-0.12	$t(1)$	JA-Test	$t(1)$	6.19
.023	$F(2,17)$	Joint Model	$F(4,17)$	15.60

The JA-Tests conducted using the economic data from the 1991-2008 time period produce very different results from those in GIL. Here, in the test for whether Model 1 encompasses Model 2, the t-statistic on the coefficient for the predicted values from Model 2 is -0.12. We cannot, in other words, reject the null hypothesis that the cultural model is encompassed by the economic model. The corresponding JA-test for whether Model 2 encompasses Model 1, however, produces a t-statistic of 6.19, a strong rejection of the hypothesis that the cultural model encompasses the economic model.

These results are consistent with those from the joint model F-tests. In the test of whether Model 1 encompasses Model 2, the restriction of the coefficients on

<sup>8</sup>Indeed, including only the initial level of wealth in Model 2 has the same effect.

the cultural model to zero does not change the sum of squared errors significantly (the F-statistic is .023). Model 1 does nearly all the work. Similarly, in the test of whether Model 2 encompasses Model 1, the restrictions of the coefficients on the economic model to zero has a highly-significant effect (F-statistic 15.60).

The conclusion from these tests is clear. Unlike GIL, who find that “both models explain aspects of growth that the rival cannot,” the cultural variables add no significant explanatory power to the economic variables. The coefficients in Model 3 illustrate this finding. When the growth rate is regressed on the combined sets of cultural and economic variables, the coefficient on Postmaterialism is significantly attenuated and the coefficient on Achievement Motivation switches signs. Neither is distinguishable from zero with a high level of statistical confidence. The economic variables, on the other hand, remain significant at the 90% level or greater. Unlike GIL, who found that the coefficient on Investment Rate fell dramatically once the cultural variables were included, these estimates show the effect of investment remains very strong. An increase in the average rate of investment by five percentage points is expected to raise the average annual growth rate of GDP per capita by .45 percentage points.

GIL derive one additional model which they refer to as the most parsimonious and efficient (see Model 4 of Table 4 in the Appendix). Specifically, they drop the three variables from their Model 3 that did not have statistically significant coefficients: Secondary Enrollment, Investment Rate, and Postmaterialism. This model has the lowest residual variance (SEE), the statistic they use to identify the model with the best fit. They also report a Schwartz Criterion (SC) score to compare specifications, finding that their parsimonious model again scores the best (lowest).

Following the same criteria with the 1991-2008 economic data leads back to Model 1, the economic model, as the most efficient and parsimonious. The only two variables that do not attain statistical significance in Model 3 are the cultural variables. Model 1 has a lower SEE than the other two models, far lower than that of Model 2. I use a similar criterion, the Bayesian Information Criterion (BIC), to accomplish the same purpose as the SC.<sup>9</sup> The model with the lowest BIC score is again Model 1.

In summary, the replication of the GIL procedures using the most recent economic data yields a very different conclusion. Cultural values do not have any significant value for predicting the average rate of economic growth in the subsequent 17 years once standard economic variables have been accounted for. The tests in this paper go one additional step, however, by expanding the sample size by 17 countries.

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<sup>9</sup>The SC is also known as the Bayesian Information Criterion (BIC), and there are different formulas for calculating it. Since the formula used in GIL was unclear, I use a standard formula for the BIC and report the results here. The BIC statistics yield the same interpretation as the SC statistics in GIL.

### 3.1 Expanded Sample

The same set of procedures was applied to the 42-country sample, yielding very similar results to those just described. These coefficients are presented in Table 3. In Model 1, the only difference in the estimates is that the coefficient on Primary Enrollment is not significant at the 90% level or greater. It still has the expected sign, however. Overall, the standard economic variables remain strong predictors of economic growth.

Model 2 contains the cultural predictors. In this model, the coefficient on Achievement Motivation is positive and significant at the .1 level, but the magnitude of the effect is substantially smaller than in GILs original predictions. In this estimate, a one standard deviation increase in Achievement Motivation is predicted to increase the per capita growth rate by .41 percentage points, compared with .96 in the original estimates (see Model 2 in Table 4). Postmaterialism is also significant in the expected direction. When comparing the fit and efficiency of this model with that of Model 1, it is clear that latter does much better. The SEE and BIC statistics are both significantly greater in Model 2.

Once again, Model 3 includes both sets of economic and cultural variables. The coefficient on Achievement Motivation (.33) becomes smaller than its standard error, meaning that it cannot be distinguished from zero with high confidence. Likewise, the coefficient on Postmaterialism is again not significant once the economic variables are included. In terms of fit and efficiency, this model performs worse than Model 1. Adding the cultural variables raises the SEE, and the larger BIC in Model 3 indicates that Model 1 is the more parsimonious.<sup>10</sup>

Lastly, Model 4 re-estimated Model 3 after excluding the outlying case of China. Absent this country, the coefficient Achievement Motivation is attenuated to zero. Given the set economic reforms in China following the disastrous years of the Great Leap Forward and the Cultural Revolution, it is difficult to attribute the extraordinarily rapid pace of economic growth in that country to cultural factors.

Accordingly, when using the broadest possible sample of countries and a more appropriate time period, the cultural values variables do not contribute any appreciable explanatory power for predicting the rate of economic growth beyond that provided by standard economic variables.

## 4 Conclusion

A danger with cultural theories of economic performance is that we observe the behaviors or attitudes of individuals in a country, characterize these observed

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<sup>10</sup>Although the JA-tests and joint model F-tests are not reported here, these tests were conducted, and their results are similar to those reported in Table 2: the null hypothesis that Model 1 encompasses Model 2 cannot be rejected, but the hypothesis that Model 2 encompasses Model 1 is rejected with high levels of confidence.

**Table 3: OLS Estimation of Economic Growth, 1991-2008 (42 countries)**

	(1)	(2)	(3)	(4)
Per capita GDP in 1991	-2.23** (0.29)		-2.37** (0.34)	-1.93** (0.39)
Primary Enrollment	3.15 (2.15)		2.91 (2.18)	0.23 (2.41)
Secondary Enrollment	3.95** (1.18)		3.20* (1.37)	3.32* (1.31)
Investment Rate	7.74* (2.86)		8.67** (3.00)	7.04* (2.95)
Achievement Motivation		0.88 <sup>^</sup> (0.51)	0.33 (0.43)	-0.00 (0.43)
Postmaterialism		-3.07* (1.17)	1.55 (1.08)	0.88 (1.07)
Constant	15.06** (2.88)	8.20** (2.19)	14.18** (2.93)	14.24** (2.79)
N	42	42	42	41
R <sup>2</sup> Adjusted	0.62	0.15	0.63	0.41
SEE	0.94	1.41	0.94	0.89
BIC	-29.38	-0.72	-24.78	-27.09

<sup>^</sup>  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$

Ordinary Least Squares (standard errors in parentheses).

tendencies as culture, and then ascribe causal force to them. Not only can this process lead us to incorrectly treat the societal effects of an economic growth pattern as the cause of that pattern, but it can create stereotyped descriptions of country cultures in which the cultural features of economically successful countries are treated as virtuous and vice-versa.

GIL attempt a more systematic approach by seeking to measure cultural values in a standard, reliable manner across a broad set of countries. This procedure reduces the extent to which measurement of cultural characteristics in any particular country is driven by a researcher's idiosyncratic or subjective judgments. Secondly, they incorporate the resulting measurements into a standard growth regression, creating the ability to control for other factors that affect economic performance. The goal is to bring cultural variables into the menu of standard variables for explaining economic growth.

The 1990 World Values Survey data used to construct the measures of achievement motivation and postmaterialism, however, come at the end of the period of economic performance in question. This fact renders the statistical procedures in GIL unable to test whether these factors are good predictors of future economic performance. As a result, we are unable to dismiss the alternative scenario raised by Jackman and Miller that economic growth merely creates an environment in which norms of thrift and determination make sense.

With the passage of time, this paper capitalizes upon the availability of 16 years of economic growth data from the period after the cultural values measurements. The ability to use these data also permits a significant expansion of the sample. As a result, the statistical tests conducted herein are much more appropriate for determining whether the cultural values are an important predictor of the future course of the economy. These tests are conclusive in finding that Achievement Motivation and Postmaterialism, as measured, do not have a significant effect.

The same procedures followed by GIL, in other words, yield a very different conclusion when applied to predicting the future rate of growth in the same set of countries. Expanding the sample weakens the case for Achievement Motivation still further. Since GIL represents the most sophisticated attempt to measure cultural attributes systematically, and to conduct rigorous empirical tests using these cultural variables, the fact that these tests undermine the claim that culture matters is a setback to cultural theories of economic performance. Future work in this area would benefit from refocusing efforts along the lines suggested by Johnson (2003): define the concept of culture clearly and identify clear mechanisms through which individual-level actions, driven by culture, produce aggregate economic effects.

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## Appendix

**Table 4: OLS Estimation of Economic Growth, 1960-1989 (GIL original)**

	(1)	(2)	(3)	(4)
Per capita GDP in 1960	-0.63** (0.14)		-0.42** (0.14)	-0.43** (0.10)
Primary Enrollment	2.69* (1.23)		2.19^ (1.07)	2.10* (0.96)
Secondary Enrollment	3.27** (1.01)		1.22 (1.08)	
Investment Rate	8.69^ (4.90)		3.09 (4.44)	
Achievement Motivation		2.07** (0.37)	1.45** (0.48)	1.88** (0.35)
Postmaterialism		-2.24** (0.77)	-1.07 (1.03)	
Constant	-0.70 (1.08)	7.29** (1.50)	3.17 (1.94)	2.40** (0.78)
N	25	25	25	25
R <sup>2</sup> Adjusted	0.56	0.59	0.69	0.70
SEE	0.86	0.83	0.72	0.71
BIC	-6.55	-12.46	-11.91	-18.33

^  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$

Ordinary Least Squares (standard errors in parentheses).