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Trade openness and cultural creative destruction

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Abstract

Purpose – This paper seeks to analyze empirically the net effect of trade openness on “economic culture”, measured by indicators of trust, respect, level of self-determination, and obedience. Openness to international trade means that societies are more likely to be exposed to alternative attitudes, beliefs, ideas, and values leading to a Schumpeterian process of creative destruction whereby culture is destroyed on some margins and enhanced on others.

Design/methodology/approach – Using data on trade openness from Quinn and Sachs and Warner, the paper empirically evaluates the impact of trade openness on economic culture. The paper’s measure of culture is taken from Tabellini and Williamson and Kerekes, where data from the World Values Survey is aggregated to create a culture variable. The paper isolates the impact of trade policies on economic culture through a variety of empirical strategies including both panel and cross sectional analysis.

Findings – The central finding of the study is that a society’s openness to international trade generates, on net, positive effects on economic culture. The more open a country is to trade, the more likely it is to possess culture conducive to economic interaction and entrepreneurship.

Originality/value – This paper contributes to the existing literature by studying the impact of trade openness on culture. While previous studies have asked “Does culture affect economic outcomes?”, this paper explores the answer to the related question, “How does openness to trade affect culture?”.

Keywords Development, Economic growth, Entrepreneurial action, Globalization, International trade

Paper type Research paper

1. Introduction

There is widespread consensus among economists regarding the net economic benefits of trade openness. As Dollar and Kraay (2004) note, “Openness to international trade accelerates development: this is one of the most widely held beliefs in the economics profession, one of the few things on which Nobel prize winners on both the left and the right agree” (p. F22). Further, there are numerous empirical cross-country studies exploring how openness impacts a variety of economic and political outcomes (Rodrik, 1998; Durham, 1999; Wei, 2000; Versakelis, 2001; Schneider and Wagner, 2001; Wacziarg, 2001; Yanikkaya, 2003). Missing from the existing literature is an analysis of the connection between international trade openness and culture. One reason for this gap is the fact that culture “is so broad and the channels through which it can enter economic discourse so ubiquitous (and vague) that it is difficult to design testable, refutable hypotheses” (Guiso *et al.*, 2006, p. 23). However, with improved data regarding values and beliefs, economists have paid increasing attention to the link between culture and economic phenomena (see, for instance, Tabellini, 2008a, b, 2010).

This paper contributes to the existing literature by studying the impact of trade openness on culture. While previous studies have asked “does culture affect economic



outcomes?” (see Guiso *et al.*, 2006), we explore the answer to the related question, “how does openness to trade affect culture?” In order to overcome the broadness of the concept of culture, we concentrate on several cultural traits – trust, perceived level of self-determination, respect for others, and obedience – which are relevant for entrepreneurship. One can think of this subset of traits as “economic culture,” defined by Porter (2000, p. 14) as “the beliefs, attitudes, and values that bear on economic activities of individuals, organizations, and other institutions.” Narrowing the concept of culture in this manner allows us to explore how trade openness impacts specific cultural characteristics which are likely to affect economic outcomes through entrepreneurial activity.

Using data on trade openness from Quinn (1997) and Sachs and Warner (1995), we empirically evaluate the impact of trade openness on economic culture. Our measure of culture is taken from Tabellini (2010) and Williamson and Kerekes (2010) where data from the World Values Survey (WVS) is aggregated to create a culture variable. We attempt to isolate the impact of trade policies on economic culture through a variety of empirical strategies including both panel and cross-sectional analysis. The panel data covers the time from 1950 to 2004, using five-year averages creating 11 time periods[1]. The cross-sectional analysis covers the same time period but averages the data across all years in order to include additional control variables.

In analyzing the effect of trade openness on economic culture, our study provides insight into the net effect of the process of Schumpeterian creative destruction as it applies to economic culture. The process of “cultural creative destruction” indicates that openness to trade will destroy existing economic culture on some margins while enhancing it on other margins. A key question is the direction of the net effect of trade openness. Our evaluation of the data suggests that trade openness has a net positive, significant and robust impact on economic culture. The more open a country is to the trade, the more likely it is to possess culture supporting economic interaction and entrepreneurship. We are cognizant of the likelihood of reverse causality and endogeneity among our results and therefore interpret our findings cautiously. However, our findings are robust to the inclusion of a variety of control variables, different model specifications, including instrumental variable analysis, and alternative trade and culture measures, lending further credibility to our findings.

Our focus on trade openness and the cultural values associated with economic interaction and entrepreneurship contributes to several strands of existing literature, the first of which explores the link between culture, entrepreneurship, and development (Lavoie and Chamlee-Wright, 2000; Harper, 2003). A related strand of literature draws on psychology to study how a society’s culture, in the form of values, beliefs, and norms influences entrepreneurship through individual’s perceptions of their “locus of control” and “self-efficacy” (see Lane, 1991; Harper, 2003). A third strand of literature highlights the importance of culture on the extent of the market in the form of social capital and trust (see Knack and Keefer, 1997; Woolcock, 1998; Francois and Zbojnik, 2005; Chan, 2007). Finally, we contribute to the literature focussing on the role of institutions (North, 1961, 1990, 2005; Davis and North, 1971; Keefer and Knack, 1997; Licht *et al.*, 2007; Shirley, 2008) which recognizes the importance of culture in the process of economic change and development. As North (2005) emphasizes, culture determines the performance of a society over time by framing the perceptions of individuals regarding opportunities and alternatives.

We proceed as follows. Section 2 explores the theoretical connection between trade openness and the process of cultural creative destruction. Section 3 discusses how the

trade openness and economic culture variables are measured, as well as the control variable employed. We also make clear how each of the cultural variables considered can influence entrepreneurship. Section 4 provides our empirical results, while Section 5 examines their robustness. Finally, Section 6 concludes with the implications of our analysis.

2. Trade openness and cultural creative destruction

Joseph Schumpeter (1934) defined entrepreneurship as the process of “carrying out [...] new combinations” in five specific situations: introducing a new good or a new quality of an existing good; introducing a new production method; opening a new market; obtaining a new source of raw materials; and lastly establishing a new organization of an industry (p. 66). Schumpeter (1942) later coined the now famous term “creative destruction” to describe the broader process of entrepreneurial innovation. This process is typically thought of in terms of physical goods and services. However, as Cowen (2002) points out, this same logic can also be applied to the process of cultural exchange.

The underlying logic is that trade not only results in the exchange of goods and services, but also in exposure to different attitudes, beliefs, ideas, and values. Cultural exposure can be both direct and indirect. Direct cultural exposure refers to those situations where an entrepreneur purposefully introduces a cultural product, organization, or method into a market. For example, the opening of a restaurant serving ethnic food would be an example of direct cultural exposure. In this example the entrepreneur purposefully introduces the product or service to the new market precisely because of its cultural characteristics. Indirect cultural exposure, in contrast, refers to entrepreneurial activities where cultural influence is not the primary goal of the entrepreneur, but instead is an unintended consequence of entrepreneurial activity. For example, when a company does business abroad it exposes entrepreneurs in that country to alternative business practices. In such cases cultural exposure is not the primary motivation of the entrepreneur, but instead is an indirect effect of the openness to international trade.

The process of cultural creative destruction does not end with the initial exposure – whether direct or indirect – to alternative attitudes, beliefs, ideas, and values. As Holcombe (1998) points out, most entrepreneurial activities are the result of previous entrepreneurial activities which create a whole new set of subsequent opportunities. In the context of culture this implies that initial exposure to alternative cultures will create subsequent opportunities which will then further influence the society’s culture. This implies that instead of viewing culture as a fixed stock, it is more suitable to view it as an ongoing process of change for better or worse (Cowen, 2002).

In sum, openness to international trade exposes a society’s cultures to a process of creative destruction. This process destroys existing culture on some margins while enhancing it on others. Just as the introduction of a new product or production technique destroys existing combinations while creating new opportunities, so too does the process of cultural exchange. Of course extending the logic of creative destruction to culture says nothing, by itself, about the net effect of trade openness on culture. There are two main views regarding the direction of this effect.

The first view – the negative-sum view – holds that trade openness is, on net, destructive to a society’s social cohesion and identity. For example, it has been argued that international trade openness can result in the erosion of social networks and hence social cohesion (Rodrik, 1997; Chan, 2007). From this standpoint trade disturbs the

status quo, including existing norms of trust and cooperation by encouraging individualism and profit-seeking over social relations. A related argument emphasizes that openness to trade can have perverse effects on culture in terms of perceived loss of identity (Barber, 1995; Huntington, 1996). Under this scenario, individuals, or groups of individuals, view global integration as a threat to their core values and beliefs. The result is that indigenous individuals view global trade as reducing their ability to control their lives. This can lead to a backlash against global trade and integration, and in the limit, can result in violent conflict. In both instances subsequent entrepreneurial activity is threatened either because of a reduction in the informal institutions that allow for fluidity in economic interactions, in the case of eroded social cohesion, or in the loss of perceived control over one's life, in the case of lost identity.

In contrast to the negative-sum view of trade openness, the positive-sum view holds that international openness to trade has a net benefit on a society's cultural values. For example, Cowen (2002) contends that while globalization destroys certain aspects of a society's culture, it also leads to a wide array of new cultural products which are beneficial. Further, trade openness can promote views of individual autonomy and increase the likelihood of risk taking in economic activities, both of which are important for entrepreneurship. Finally, it could be argued that, in contrast to eroding social cohesion, openness to trade provides people with an increased number of opportunities for interaction and exchange which can generate trust through the cultivation of social relationships. Along these lines Storr (2008) emphasizes that markets should be understood as a "social space" where both economic and non-economic relationships emerge and develop. Jones (2006, pp. 85-6) notes that the merging of cultures creates commonalities reducing the costs associated with interaction and exchange. These reduced transaction costs lead to increased interactions fostering trust and contributing to the growth of social networks and the extent of the market. The purpose of subsequent sections is to empirically analyze the net effect of international openness on economic culture to determine which one of these views is supported by the data.

3. Data

3.1 Trade openness

We focus on trade policy openness defined as the unrestricted ability to interact within international financial and commodity markets. In order to capture trade openness, we rely on three different trade policy measures of openness found in the existing literature. The first two measures of openness capture the degree of financial regulation and are taken from Quinn (1997) and Quinn and Toyoda (2007, 2008). The third is the Sachs and Warner (1995) trade openness measure[2].

Quinn (1997) and Quinn and Toyoda (2007, 2008) create two openness indices defined as "the many government policies regulating inward and outward financial transactions." The first index measures the degree of regulation surrounding the capital account (openness-capital) while the second index focusses on restrictions on the current account (openness-current). These indices are based on an interval scale constructed by coding domestic and international laws taken from the IMF's *Exchange Arrangements and Exchange Restrictions*. The indices are scaled from 0 to 100 with 100 representing a country fully open to inward and outward capital flows. Data are available from 1950 to 1999 for 94 countries.

Sachs and Warner (1995) construct a dummy variable for openness based on five individual criteria for specific trade-related policies (openness-SW). This criterion includes tariff rates, non-tariff barriers, a black market exchange rate, a state monopoly

on major exports, and a socialist economic system. A country is classified as closed if it displays at least one of the following characteristics: average tariff rates of 40 percent or more; non-tariff barriers covering 40 percent or more of trade; a black market exchange rate that is depreciated by 20 percent or more relative to the official exchange rate; a state monopoly on major exports; and a socialist economic system. These five characteristics are included to cover various types of trade restrictions. A dummy variable equal to 1 classifies a country as open and 0 if closed.

We view these three measures of openness as capturing the trade policy environment due to their nature of quantifying past trade policies for a large number of countries. This is especially critical since we are attempting to estimate the impact openness exhibits on culture. Hence, it is important to take into account the historical environment of trade policies as cultures tend to evolve and change slowly (see Williamson, 2000, p. 597). Given this, we implement lagged measures of trade openness in order to fully capture this relationship. Specifically, in the panel analysis we use a five-period lag of openness in the regression specifications as this incorporates past trade policies and maximizes the sample size of countries[3].

3.2 Culture

Our focus is on identifying cultural characteristics relevant to social and economic interaction and exchange. In order to measure culture, we rely on a culture variable first identified by Tabellini (2010) and later expanded by Williamson and Kerekes (2010). The cultural variable is constructed by building-off of existing sociological literature that identifies cultural traits that serve as constraints on entrepreneurial behavior and hence influence economic development for better or worse. The variable is broken into four categories: trust, control and individual self-determination, respect, and obedience. Tabellini (2010), Lane (1991), and Harper (2003) argue that trust, respect, and individual self-determination encourage social interaction, entrepreneurship, and production. In contrast, obedience may negatively impact economic development by hindering risk-taking entrepreneurial activities.

Trust: influences entrepreneurship by reducing transactions costs facilitating market exchanges resulting in faster movement toward efficient outcomes (Fukuyama, 1996; Dixit, 2004). A lack of trust between individuals raises the cost of monitoring and increases transactions costs resulting in individuals trading among small networks rather than expanding into anonymous market participation. Along these lines, the exiting literature on trust and social capital argues that higher trust societies will experience higher levels of economic development and growth (Knack and Keefer, 1997; Woolcock, 1998; Francois and Zabojnik, 2005).

Control: refers to the perceived level of self-determination held by individuals in a society. Individual motivation depends on the level of self-control individuals believe they have over their choices. This is influenced by whether individuals reap the benefits or consequences of their actions. The more likely it is that economic success will be determined by one's own will, the more likely individuals will work harder, invest in the future, and engage in entrepreneurial activities. However, if individuals view the likelihood of succeeding as a product of luck or political connections, they will tend to refrain from engaging in productive entrepreneurial activities. In general, people's perceived "locus of control" over economic activity will impact a country's overall level of development for better or for worse through its effect on entrepreneurial activity (Banfield, 1958).

Respect: refers to tolerance of other people – their choices, views, etc. The measure of respect is grounded in the distinction between generalized morality and limited morality. Platteau (2000) argues that in some societies it is morally acceptable to engage in highly opportunistic behavior outside of one's small group or network. Other societies may develop abstract rules to guide social interactions in a generalized sense in order to promote morality among anonymous members of society. These two distinct types of morality have economic consequences including the provision of public goods in local communities and the monitoring of political representatives (Banfield, 1958; Putnam, 1993). Further, the extent of respect will directly influence the payoff to productive entrepreneurship. In societies where respect is low, meaning that opportunistic behavior is viewed as acceptable, we would expect lower levels of entrepreneurship, all else constant.

Obedience: refers to deference to authority. Obedience in one form or another is present in all social systems, but societies that discourage individualism also discourage feelings of personal control and determination in children. The result is reduced risk taking when it comes to social relationships, innovation, and entrepreneurship, which can have adverse effects on social and economic development. An existing literature in economic psychology indicates that parents play a key role in influencing their children's locus of control and perception of autonomy which directly influences their likelihood of being entrepreneurial as they grow older (see Harper, 2003, pp. 54-5). Development ultimately requires the acceptance of the possibility that individuals as entrepreneurs will make choices contrary to the desires of authority figures. If this possibility does not exist because the "[...] individual is subjected to a network of controls, the society loses the essential engine of economic development [...]" (Grondona, 2000, p. 48).

Each of these cultural traits is measured by utilizing survey data from the European Values Survey and WVS. These surveys capture culture in the form of individual beliefs and values reflecting local norms and customs (The European Values Study Foundation and World Values Survey Association (EVSF-WVSA), 2006). In order to maximize sample size, we pool all countries surveyed in any of the five waves over the time periods 1981-1984, 1989-1993, 1994-1999, 1999-2004, and 2005-2007. Survey answers are utilized and aggregated to create the culture variable for each period. Each component of culture has a corresponding question from the survey and a different aggregation process that is discussed in Appendix 2.

Combining all four traits, one comprehensive measure for culture for each country, for each time period, is achieved by summing trust, control, and respect, and subtracting the obedience score. Since we are concerned with the impact of trade openness on economic culture, this aggregate variable serves as the main focus of our empirical analysis. Over all five periods, the comprehensive measure is converted to a relative scale ranging from 0 to 10, with 10 representing the country with the strongest culture and 0 representing the country with the weakest culture relevant for economic interaction. Countries with consistently high economic culture scores include Sweden, The Netherlands, Finland, and Denmark, while those ranking in the bottom are Uganda, Rwanda, and Ghana. See Appendix 3 for the culture index by country and year and each country's average score and rank.

3.3. Control variables

In addition to trade openness, it is important to control for other factors that could possibly influence a country's economic culture. We follow the existing development

literature on institutions in selecting the following controls: country size, gross domestic product (GDP) growth, GDP, urban population, and formal political institutions. We use the log of both population and area to control for country size. We also control for urban population measured as the percentage of the population living in an urbanized area. Data for the first five controls is taken from World Bank (2006).

The level of development, captured by GDP PPP (constant 2,000 international dollars), is also included in the analysis. We recognize the possible endogeneity problems that may arise from the inclusion of this variable. However, we want to ensure that the relationship between trade openness and culture is robust to the inclusion of the level of development. The growth of income is also included in the regression specifications. The “institutions rule” literature (Acemoglu *et al.*, 2001, 2002; Rodrik *et al.*, 2004; Acemoglu and Johnson, 2005) argues that institutions are a fundamental cause in economic development. Tabellini (2010) illustrates the strong positive relationship of informal institutions on the growth of GDP. However, Glaeser *et al.* (2004) highlights the effect of income growth on institutions. Thus, as an additional control we use the growth of GDP.

Another potentially important factor influencing culture is a country’s formal institutions. Formal institutions refer to codified rules such as constitutions, legislation, legal and political procedures, and so on (see North, 1990, 1991). Although formal institutions can reflect a society’s culture, they also can serve as constraint on the evolution of cultural norms. For example, in his study of the “real” Peruvian economy, De Soto (1989) found a flourishing underground economy that relied on informal cultural norms for operation. The evolution of these informal norms, and the extent of the market, was constrained by corrupt and dysfunctional formal institutions. In this case, like in many underdeveloped countries, informal cultural norms serve as a substitute for weak or non-existent formal institutions[4]. However, it is also possible that well-functioning formal institutions can enhance and complement a society’s culture. North (1990) argues that as a country codifies its existing informal institutions into formal rules, it allows for further development of norms, customs, and culture.

Given this, we find it necessary to control for past formal institutions in our empirical analysis. In order to do so, we rely on a common measure of formal institutions, the Polity IV measure of democracy (Jagers and Marshall, 2000). This index is measured on a scale from 0 to 10 with 10 representing most democratic. This variable is derived from a combination of quantifying the competitiveness of the political process, the openness and competitiveness of executive recruitment, and constraints on the chief executive. This index is also attractive because it covers 162 countries over the time period from 1800 to 2007. We control for the effect of past formal institutions by including a 100-year lag of the democracy index[5].

4. Results and analysis

4.1 Benchmark panel results and analysis

Summary statistics for all of the variables used in the panel analysis are provided in Appendix 4. The number of observations, mean, standard deviation, and minimum and maximum values for each variable is reported. We use 65 countries covering the time period of 1950-2004 (creating 11 time periods using five-year averages) with income per capita ranging from \$488 to \$59,880. Culture spans from 1984 to 2004 (five time periods) ranging from 0 to 10 with a mean of 4.46 and a standard deviation of 1.88.

Recall that trade openness is used in the analysis with a five-period lag, spanning the years from 1959 to 1979 (five time periods). For example, culture in 2004 is matched with openness in 1979, and so on. Openness-capital is scaled from 0 to 100 with a mean of 52.59 and a standard deviation of 28.44. Openness-current is scaled from 0 to 100 with a mean of 52.65 and a standard deviation of 26.19. Trade openness-SW is measured as 0, 1 with a mean of 0.32 and a standard deviation of 0.45.

It is necessary to point out that many of the control variables are highly correlated with trade openness and with one another (see Appendix 5). For example, all three measures of openness are correlated with democracy (over 0.33). Growth and GDP are correlated over -0.24 and 0.22 , respectively, with trade openness. Also, urban population is highly correlated with openness-capital and openness-current (0.50 and 0.46 , respectively). Although these variables are highly correlated with our main variable of interest, we believe it is important to include these additional controls 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 partially address this issue we show the results with and without the controls, in addition to implementing instrumental variable estimation in order to minimize the endogeneity effect.

As a benchmark, we first show the basic relationship between the four components of culture, the overall culture index, and the three measures of trade openness by employing univariate ordinary least squares (OLS) regressions on our panel dataset. The univariate regression is identified as:

$$C_{it} = \mu + \beta T_{it} + \varepsilon_{it}$$

where C equals each component (trust, control, respect, obedience) of culture or the overall index and T represents trade openness.

The benchmark univariate OLS regressions are shown in Table I.

Panels one through five report the results using the different dependent variables. They are trust, control, respect, obedience, and the overall culture index, respectively. Columns (1) reports the effect of openness-capital on the dependent variables, columns (2) show how openness-current relates to the dependent variables, and columns (3) report the regression results using openness-SW as the trade measure.

The first panel of regressions reports the effect of trade openness on trust. All three regressions suggest a positive and significant relationship between openness and the level of trust, with openness-SW displaying the strongest effect. These findings imply that the more open an economy is to trade, the higher the level of trust that will exist within that country. In the second panel, we also find a strong positive and significant relationship between all three measures of openness and the level of individual self-control. Panel three reports the results using the level of respect as the dependent variable – greater trade openness is positively and significantly related to the level of respect. Regressions reported in panel four indicate that trade openness is negatively and significantly related to the level of obedience. The last panel of regressions employs the overall culture index as the dependent variable. All three measures of trade openness have a strong positive and significant impact on culture. This finding is in line with our main hypothesis, which argued that the net effect of trade openness on culture is positive.

Given this understanding of how trade openness affects each individual cultural component, the next section focusses on the aggregate cultural index as the main

Table I.
Culture and trade
openness panel OLS
model – benchmark
specification

	Dependent variable – trust			Dependent variable – control			Dependent variable – respect			Dependent variable – obedience			Dependent variable – culture		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Openness-capital	0.085* (0.050)			0.054** (0.022)			0.090** (0.043)			-0.157*** (0.053)			0.022*** (0.006)		
Openness-current		0.181*** (0.049)			0.087*** (0.022)			0.160*** (0.043)			-0.184*** (0.054)			0.036*** (0.006)	
Openness-SW			14.225*** (2.350)			3.724** (1.439)			10.280*** (2.065)			-13.130*** (2.719)			2.476*** (0.287)
Constant	27.660*** (2.845)	22.149*** (2.965)	23.999*** (1.549)	66.592*** (1.264)	64.624*** (1.326)	66.784*** (0.956)	63.961*** (2.449)	59.879*** (2.561)	63.927*** (1.361)	44.525*** (3.023)	46.526*** (3.231)	4.164*** (1.792)	3.698*** (0.356)	2.860*** (0.359)	3.469*** (0.190)
Adjusted R ²	0.01	0.08	0.18	0.04	0.09	0.04	0.02	0.08	0.13	0.051	0.068	0.120	0.080	0.205	0.316
Number of observations	149	149	165	144	144	160	149	149	165	149	149	165	144	144	160

Notes: Standard errors are in parentheses. *, **, ***Significance level at 10, 5 and 1 percent, respectively

dependent variable. The goal is to understand the impact of trade openness on the overall level of culture. While the impact of openness on each individual component is indeed important, focussing on aggregate culture provides insight into the net effect of trade across all of the components. The underlying logic is that openness to trade may positively impact some cultural components while negatively impacting others. Considering the overall level of culture allows us to isolate the net effect of trade openness.

4.2. Core panel results and analysis

4.2.1 *Random effects model.* We now turn to our main model specification where we implement a random effects model adding in our control variables[6]. Our main model specification can be identified as:

$$C_{it} = \mu + \beta T_{it} + Z_{it}'\delta + \varepsilon_{it}$$

where C equals the culture index, T is trade openness, and Z represents the vector of control variables including year dummies.

The previous results provide us with a benchmark specification. Table II builds from this analysis by turning to a more complete empirical model with a variety of regression specifications.

Columns (1) through (6) show the results from both the univariate regressions and the regressions with the control vector. Columns (7) through (12) replicate the first six regressions with the inclusion of year dummies.

The results from the bivariate regressions (columns 1-3) support the previous OLS findings where all three trade openness measures impact culture positively and significantly (at the 99 percent level). Columns (3) through (6) show that trade openness exhibits a strong positive and highly significant relationship on culture, even after controlling for country size, growth, the level of income, urban population, and democracy. In all three regressions, the coefficients for area and democracy are positive but insignificant, while the urban coefficient is negative and insignificant. Population always displays a negative and significant relationship on culture, while the level of income is always positive and significant. The coefficient on the growth rate is always positive but is only significant in regressions (4) and (5). Overall, these findings lend further support to the claim that openness positively enhances culture.

It should be noted that we do not place a strong emphasis on the interpretation of the coefficients as both culture and the trade openness measures are indices. We are mainly interested in the sign and significance of the variables. However, we do offer a basic interpretation as a point of reference. Columns (4) and (5) measure openness with openness-capital and openness-current, respectively, and the positive and significant coefficients suggest that a ten unit increase in either Quinn openness scale will increase the culture index by approximately 0.10 units. An increase in either openness scale by one standard deviation increases the culture index by roughly 0.26 units. By comparison, a 1 percent increase in the level of GDP increases the level of culture by approximately 1.7 and 1.6 units for regressions (4) and (5), respectively. A one standard deviation increase in GDP per capita increases culture by 0.57 and 0.65 for the same specifications, respectively. Regression (6) uses the Sachs-Warner measure of openness and the positive and significant coefficient suggests that as a country moves from a closed economy (0) to an open economy (1), the culture index will be increased by 0.815, and a one standard deviation increase will result in a 0.37 unit increase in culture.

Table II.
Culture and trade
openness random effects
model – main results

	Dependent variable: culture											
	1	2	3	4	5	6	7	8	9	10	11	12
Openness-capital	0.020*** (0.006)			0.010* (0.006)			0.018*** (0.005)		0.009 (0.006)			
Openness-current		0.034*** (0.007)			0.014* (0.008)			0.023*** (0.006)			0.008 (0.007)	
Openness-SW			1.349*** (0.315)			0.815** (0.308)			1.625*** (0.318)			-0.019 (0.348)
Population (log)				-1.975*** (0.505)	-1.871*** (0.508)	-1.466*** (0.524)				-1.514*** (0.507)	-1.531*** (0.511)	-1.608*** (0.533)
Area (log)				0.199 (0.206)	0.179 (0.201)	0.213 (0.202)				0.191 (0.211)	0.190 (0.210)	0.222 (0.211)
Growth				0.123* (0.065)	0.141** (0.067)	0.067 (0.059)				0.005 (0.060)	0.013 (0.062)	-0.019 (0.054)
GDP PPP (log)				1.756*** (0.370)	1.628*** (0.383)	1.222*** (0.410)				1.232*** (0.379)	1.236*** (0.388)	1.324*** (0.420)
Urban population				-0.021 (0.018)	-0.020 (0.018)	-0.006 (0.018)				-0.017 (0.018)	-0.017 (0.018)	-0.016 (0.019)
Democracy score				0.069 (0.075)	0.067 (0.073)	0.067 (0.073)				0.102 (0.073)	0.100 (0.073)	0.113 (0.074)
Year effects	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Constant	3.384*** (0.383)	2.618*** (0.415)	3.982*** (0.160)	-10.075** (4.348)	-8.536* (4.385)	-5.545 (4.555)	2.404*** (0.3777)	2.030*** (0.394)	3.254*** (0.320)	4.147 (4.705)	-3.948 (4.725)	-4.918 (4.897)
R ² (overall)	0.09	0.21	0.32	0.37	0.39	0.37	0.05	0.18	0.30	0.35	0.37	0.35
Number of observations	144	144	160	107	107	110	144	144	160	107	107	110

Notes: Standard errors are in parentheses. *, **, ***Significance level at 10, 5 and 1 percent, respectively. Regression (3) is fixed effects

A 1 percent increase in the level of GDP will increase culture by approximately 1.22 units. Given the well-established relationship between trade openness and the level of GDP, we also recognize that these coefficients may be misleading due to endogeneity concerns, which we attempt to address in the following subsection. However, we do think that it is encouraging that openness remains significant even with this concern.

The next set of regressions (columns 7-12) replicates the first six regressions but now includes year dummies. The same result emerges in regressions (7) through (9) as in regressions (1) through (3) where all three measures of trade openness positively and significantly affect culture. In regressions (10) through (12), however, all three measures lose their significance after the inclusion of the control vector and year dummies. Population (negative coefficient) and GDP (positive coefficient) remain significant in all three regressions. We do not view this result as casting a strong doubt on the relationship between openness and culture. Instead, we believe openness loses its significance by adding in year dummies as a result of only having approximately 107 observations as well as the possibility that our dataset does not include a time period long enough to see significant changes in culture over time.

It should also be highlighted that in the regressions with openness-current and openness-SW, the adjusted R^2 from the univariate regressions to the regressions with the controls do not increase by a large portion. This suggests that the additional control variables may not be explaining much more of the variation in culture than was previously captured by trade openness (current and SW measures only) alone.

We view these results as providing evidence that trade openness can positively enhance culture. Specifically, our results support the argument that trade openness enriches overall culture for the better. In regression specifications (1) through (9), all three measures of trade openness demonstrate a strong positive and highly significant impact on culture. Even with the inclusion of a variety of controls, including the level of income, openness remained a strong determinant of culture.

4.2.2 Random effects with IV estimation. In order to provide a more complete model specification, we re-estimate the random effects model with instrumental variable analysis. We use a one-period lag (a five-year average) of our trade openness measures to instrument for each trade openness index. In other words, a six-period lag instruments for the five-period lagged value of each trade openness index. To provide a specific example, openness for the period 1974 instruments for openness in the period 1979, which is matched with culture in 2004. We recognize that using a lagged value as an instrument is not a perfect solution; however, it is difficult to find good instruments that are correlated with the exogenous variables but not with the errors terms[7]. Therefore, it is becoming more commonplace in the literature to rely on using lagged values instead of other weaker instruments (Boone, 1996; Yanikkaya, 2003; Williamson, 2009). The validity of the instrument is supported by the first stage results reported in Appendix 6. As shown, the lagged value of openness significantly determines the current value that is being instrumented. In addition, both the Wald statistic for the panel and the F -statistic for the cross-section, as well as the R^2 , suggest the validity of implementing the values as instruments. Also, these past openness values are not as strongly correlated with the current culture values as shown in Appendix 5.

Table III replicates the regression specifications of Table II, but now instruments for trade openness. In 11 out of the 12 regressions, openness displays a positive and significant impact on culture. The previous result remains from the univariate

Table III.
Culture and trade
openness random effects
IV model – main results

	Dependent variable: culture											
	1	2	3	4	5	6	7	8	9	10	11	12
Openness-capital	0.037*** (0.009)			0.024** (0.010)	0.026*** (0.008)					0.017* (0.009)		
Openness-current		0.051*** (0.010)			0.033*** (0.012)			0.038*** (0.010)			0.021* (0.012)	
Openness-SW			2.103*** (0.408)			1.511** (0.629)			2.472*** (0.528)			1.484 (1.010)
Population (log)				-1.789*** (0.516)	-1.511*** (0.543)	-0.962 (0.661)				-1.400*** (0.515)	-1.294** (0.548)	-0.701 (0.799)
Area (log)				0.165 (0.205)	0.110 (0.206)	0.192 (0.215)				0.167 (0.208)	0.142 (0.216)	0.180 (0.232)
Growth				0.131* (0.068)	0.171** (0.070)	0.063 (0.061)				0.019 (0.062)	0.040 (0.066)	0.019 (0.061)
GDP PPP (log)				1.614*** (0.381)	1.295*** (0.421)	0.718 (0.568)				1.141*** (0.389)	1.019** (0.425)	0.433 (0.712)
Urban population				-0.024 (0.018)	-0.022 (0.018)	0.003 (0.020)				-0.019 (0.018)	-0.018 (0.018)	0.007 (0.025)
Democracy score				0.059 (0.075)	0.063 (0.074)	0.061 (0.078)				0.094 (0.073)	0.099 (0.074)	0.093 (0.082)
Year effects	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Constant	2.566*** (0.507)	1.734*** (0.567)	3.235*** (0.276)	-9.541** (4.370)	-5.993 (4.611)	-1.501 (5.669)	3.174*** (0.465)	2.326*** (0.614)	3.032*** (0.345)	-4.338 (4.647)	-2.914 (4.936)	1.295 (6.919)
R ² (overall)	0.09	0.21	0.32	0.34	0.37	0.35	0.07	0.21	0.33	0.33	0.36	0.32
Number of observations	144	144	157	107	107	109	144	144	157	107	107	109

Notes: Standard errors are in parentheses. *, **, ***Significance level at 10, 5 and 1 percent, respectively

regressions, without and with year dummies, presented in columns (1)-(3) and (7)-(9). In regressions (4) and (5) the same result emerges except both openness measures actually gain significance from the previous results. In column (6), openness-SW retains its positive and significant coefficient, while population and GDP lose their significance. The main difference from this re-estimation is that openness measures in regressions (10) and (11) are now significant. Population remains negative and significant while the level of GDP is positive and significant. Openness in regression (12) remains insignificant. Also, in all 12 regressions, the coefficients are actually larger than in the previous model. For example, a ten-unit increase in the capital and current openness measures increases economic culture by 0.37 and 0.51 units, respectively. A one standard deviation increase in either measure increases economic culture by 1.05 and 1.34 units, respectively.

5. Robustness

5.1 Cross-sectional analysis

Our first robustness check averages the data in order to test for omitted variable bias by including three additional control variables that could not be included in the panel analysis. The control vector now includes a measure of income inequality, education rates, and a geography variable in addition to the original control variables. Income inequality is measured by the Gini coefficient and is taken from World Bank (2006). We predict that greater income inequality will display a negative effect on culture.

We also include the effect of lagged education rates (in log form) measured as the number of years of schooling for the total population over age 25 by 1960. The positive link between education and development is well documented (see Barro, 2001, 2002). Along similar lines, a higher educated population may adopt better institutions (Tabellini, 2010). We want to control for this possibility through cross-country differences in school enrollment. This data are collected from Glaeser *et al.* (2004)[8].

Lastly, we include geography, measured as distance from the equator, or latitude, as another control variable because of its possible effects on institutions and development. Diamond (1997), Gallup *et al.* (1999), and Sachs (2001, 2003) argue that geography has a direct impact on economic development due to climate, the disease environment, endowment of resources, and transactions costs. However, Engerman and Sokoloff (2004), Sala-i-Martin and Subramanian (2003), Easterly and Levine (2003), and Rodrik *et al.* (2004) find that geography only exhibits an indirect effect on development by impacting the quality of current institutions. The argument is that certain factor endowments permit extreme inequalities and the dominance of a small group of elites. These differences in endowments may have stunted institutional (formal and informal) development. Therefore, we control for the impact of geography on culture.

Table IV presents the OLS cross-sectional results. To be consistent with the panel analysis, we use lagged openness measures averaged from 1974 to 1979. We also control for the level of GDP from this time period. Culture is averaged for all countries from 1981 to 2004 and the rest of the control variables are averaged from 1950 to 2004. Columns (1)-(6) are consistent with the regressions in Tables I-III indicating that trade openness has a positive and significant impact on culture. The control variables retain their same relationship except area is now positive and significant in regressions (4) and (5). Regressions (7)-(9) add in the additional controls. In regression (7) openness-capital has a positive and significant coefficient, population and inequality have a

Table IV.
Culture and trade
openness cross-sectional
OLS model

	Dependent variable: culture								
	1	2	3	4	5	6	7	8	9
Openness-capital	0.043*** (0.011)			0.028** (0.013)			0.027** (0.011)		
Openness-current		0.053*** (0.010)			0.035*** (0.012)			0.034*** (0.010)	
Openness-SW			2.661*** (0.463)			1.250** (0.615)			0.492 (0.655)
Population (log)				-1.605*** (0.578)	-1.178** (0.585)	-0.759 (0.560)	-0.945* (0.493)	-0.628 (0.471)	-0.701 (0.566)
Area (log)				0.425** (0.183)	0.364** (0.168)	0.190 (0.163)	0.343* (0.175)	0.265 (0.161)	0.220 (0.181)
Growth				0.524** (0.200)	0.460** (0.195)	0.142 (0.191)	0.086 (0.220)	0.074 (0.205)	0.021 (0.231)
GDP PPP (log)				1.139** (0.551)	0.830 (0.567)	0.828 (0.507)	0.447 (0.462)	0.162 (0.446)	0.438 (0.510)
Urban population				-0.010 (0.018)	-0.006 (0.016)	0.006 (0.017)	-0.011 (0.021)	-0.002 (0.019)	0.006 (0.020)
Democracy score				0.158 (0.113)	0.204*** (0.110)	0.111 (0.107)	-0.088 (0.138)	0.003 (0.133)	0.015 (0.129)
Education (log) 1960							1.416*** (0.657)	1.118* (0.624)	0.753 (0.541)
Latitude							-1.335 (1.396)	-1.273 (1.297)	-1.021 (1.550)
Income inequality							-0.076*** (0.023)	-0.069*** (0.021)	-0.088*** (0.028)
Constant	2.440*** (0.574)	1.647*** (0.577)	3.032*** (0.309)	-9.322* (5.485)	-6.153 (5.522)	-8.468** (4.490)	6.099 (5.266)	7.464 (4.947)	4.589 (5.095)
Adjusted R ²	0.23	0.36	0.34	0.51	0.55	0.50	0.71	0.81	0.60
Number of observations	55	55	64	49	49	57	43	43	47

Notes: Standard errors are in parentheses. *, **, ***Significance level at 10, 5 and 1 percent, respectively

negative and significant coefficient, area and education are positive and significant, while the additional controls are insignificant. In regression (8), openness-current remains significant as does inequality and education. All other variables lose significance. With the additional controls, openness-SW is insignificant in regression (9). Only income inequality remains (negative) significant in this regression specification.

Table V presents the results from the cross-sectional IV estimation. We rerun the regressions from Table IV instrumenting openness with a one-period lagged value of each index, averaged from 1969 to 1974, as in the panel model. In seven out of nine of the regressions, openness retains its positive and significant relationship with culture. Openness-capital loses its significance in regression (4) and openness-SW remains insignificant in regression (9). The coefficients are also somewhat larger in this specification. For example, a one-unit increase in either of the Quinn measures increases culture between 0.24 and 0.49 units, depending on the specification. Increasing capital or current openness by one standard deviation results in an increase of culture between 0.60 and 1.23 units[9].

5.2 Alternative culture index

In order to ensure that our results are not sensitive to the construction of the culture variable, we create a new, alternative culture index using principal components analysis (PCA) to extract the common variation between all four components. PCA is a technique that systematically reduces several independent variables into a more coherent variable capturing most of the information in the original dataset. The PCA technique is especially applicable in cases where multicollinearity is a concern, or when there are conceptual ambiguities regarding the construction of an index (see Dunteham, 1989). The benefit of using this technique over simply summing the four cultural components is that PCA extracts the common variation between all four factors, creating an overall net measure of culture that should support economic development. For this reason we employ the PCA technique, which has also been used in previous studies employing the same cultural components as our analysis to construct a culture index (see Tabellini, 2010; Williamson, 2009).

The PCA culture index is scaled from 0 to 10, with 10 representing the country with the highest level of culture. We rerun the IV regressions presented in Tables III and V with the new culture index. The previous results are confirmed. Trade openness remains positive and highly significant in the same regression specifications as before. The control variables also retain their respective signs and significance. The results are omitted to save space but are available upon request.

Overall, we believe our results from the panel models and the robustness checks suggest that trade openness positively affects economic culture.

6. Conclusion

Our empirical analysis found that trade openness has, on net, a beneficial impact on economic culture that supports entrepreneurial activity. One of the main implication of our analysis deals with how economists understand the gains from trade openness. Most discussions of global trade rightfully focus on the international division of labor and comparative advantage. Our analysis highlights another benefit of openness to international trade. While trade openness increases the extent of the market internationally, it can also increase the extent of the domestic market through the

Table V.
Culture and trade
openness cross-sectional
IV model

	Dependent variable: culture								
	1	2	3	4	5	6	7	8	9
Openness-capital	0.042*** (0.011)			0.024 (0.014)			0.029** (0.012)		0.519 (0.733)
Openness-current		0.049*** (0.010)			0.025* (0.013)			0.031*** (0.010)	-0.695 (0.572)
Openness-SW			2.930*** (0.484)			1.510** (0.672)			0.220 (0.181)
Population (log)				-1.626*** (0.580)	-1.342** (0.595)	-0.676 (0.567)	-0.941* (0.493)	-0.658 (0.473)	0.016 (0.161)
Area (log)				0.405** (0.186)	0.345** (0.170)	0.192 (0.164)	0.347* (0.176)	0.265 (0.161)	0.077 (0.016)
Growth				0.530** (0.201)	0.490** (0.197)	0.104 (0.195)	0.085 (0.220)	0.077 (0.205)	0.016 (0.237)
GDP PPP (log)				1.287** (0.555)	1.041* (0.580)	0.752 (0.514)	0.436 (0.463)	0.201 (0.449)	0.432 (0.514)
Urban population				-0.008 (0.018)	-0.003 (0.017)	0.007 (0.017)	-0.012 (0.021)	-0.002 (0.019)	0.006 (0.020)
Democracy score				0.158 (0.113)	0.190* (0.111)	0.103 (0.108)	-0.085 (0.138)	-0.008 (0.134)	0.015 (0.129)
Education (log) 1960							1.406** (0.658)	1.156* (0.627)	0.751 (0.542)
Latitude							-1.353 (1.397)	-1.251 (1.299)	-1.004 (1.564)
Income inequality							-0.075*** (0.023)	-0.071*** (0.021)	-0.087*** (0.029)
Constant	2.503*** (0.596)	1.909*** (0.600)	2.910*** (0.317)	-9.863* (5.540)	-8.110 (5.645)	-7.934* (4.532)	6.204 (5.278)	7.202 (4.966)	4.595 (5.096)
Adjusted R ²	0.23	0.35	0.33	0.51	0.54	0.50	0.71	0.75	0.60
Number of observations	55	55	64	49	49	57	43	43	47

Notes: Standard errors are in parentheses. *, **, ***Significance level at 10, 5 and 1 percent, respectively

development of local relationships and entrepreneurship. For example, where international trade increases trust it can beneficially contribute to the cultivation of both domestic and international relationships. These domestic benefits have implications for understanding the costs of protectionism. If trade openness impacts the extent of domestic and international markets, then protectionist measures may impose significant costs, not only in terms of limiting international trade, but also in terms of restricting the expansion of domestic markets through the enhancement of economic culture.

Notes

1. The 11 time periods are 1954 (average 1950-1954), 1959 (average 1955-1959), 1964 (average 1960-1964), 1969 (average 1965-1969), 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.
2. Detailed data descriptions and sources for all variables used in the empirical analysis are provided in Appendix 1.
3. For the period 2004, openness is from the period 1979, for the period 1999, openness is from the period 1974, for the period 1994, openness is from the period 1969, for the period 1989, openness is from the period 1964, and for the period 1984, openness is from the period 1959. Therefore, we have five points of analysis.
4. See Williamson (2009) for an analysis of how different informal and formal institutional arrangements affect development.
5. For example, the time period 2004 will use the democracy score in 1904, and so on.
6. The Hausman test confirmed the superiority of a random effects model over fixed effects in all regressions in both Tables II and III, except where noted.
7. One standard instrument for trade openness first identified by Frankel and Romer (1999) is a constructed value of trade/GDP based on geographic conditions. However, Rodriguez and Rodrik (2001) argued that geographically constructed trade share may not be a valid instrument because geography may exert effects on income through various channels other than international trade.
8. Data description and sources are given in Appendix 1.
9. In addition to these controls variables, we also rerun the cross-sectional IV regressions (7) through (9) with average annual population growth, government consumption (as a percentage of GDP), infant mortality (per 1,000 live births), and the average annual inflation rate, all collected from World Bank (2006). We also include regional dummy variables for Africa, East Asia, and Europe. The inclusion of these additional variables does not alter our previously discussed results. These results are available from the authors upon request.

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Variable	Data description	Sources
Trade openness-capital	This index measures the degree of regulation surrounding the capital account. It is based an interval scale constructed by coding domestic and international laws. The index is scaled from 0 to 100 with 100 representing a country fully open to inward and outward capital flows. Data are available from 1950 to 1999 for 94 countries	Quinn (1997)
Trade openness-current	This index measures the degree of regulation surrounding the current account. It is based an interval scale constructed by coding domestic and international laws. The index is scaled from 0 to 100 with 100 representing a country fully open to inward and outward capital flows. Data are available from 1950 to 1999 for 94 countries	Quinn (1997)
Trade openness-SW	A dummy variable equal to 1 classifies a country as open and 0 if closed based on tariff rates, non-tariff barriers, a black market exchange rate, a state monopoly on major exports, and a socialist economic system	Sachs and Warner (1995)
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 PCA to extract the common variation among all four components. Both indices are normalized to range between 0 and 10	The European Values Study Foundation and World Values Survey Association (2006)
Log population	Logarithm of total population	World Bank (2006)
Log area	Logarithm of total area of a country	World Bank (2006)
GDP growth	Growth of GDP per capita, PPP basis, constant 2,000 international dollars	World Bank (2006)
Log GDP	GDP, PPP basis, constant 2,000 international dollars	World Bank (2006)
Urban population	Percentage of population living in an urban area	World Bank (2006)
Democracy	The index is measured on a scale from 0 to 10 with 10 representing most democratic. The variable is derived from a combination of quantifying the competitiveness of the political process, the openness and competitiveness of executive recruitment, and constraints on the chief executive	Polity IV
Income inequality	Gini coefficient between 0 and 1 where 1 represents more inequality	World Bank (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 <i>et al.</i> (1999)
Log educational attainment in 1960	Measured as the number of years of schooling of the total population over age 25 by 1960	Glaeser <i>et al.</i> (2004)

Table AI.
Data description
and sources

Appendix 2. Construction of culture index

The first cultural trait, trust, attempts to determine the extent to which individuals believe others are trustworthy. The following question from the survey is used to measure the trust component of culture: “Generally speaking, would you say that most people can be trusted or that you can’t be too careful in dealing with people?” The level of trust is captured in each country as the percentage of respondents that answered “Most people can be trusted,” as opposed to “Can’t be too careful” and “Don’t know.”

The second component of culture, which we call “control” captures the perceived level of self-determination of respondents. To identify and capture this cultural component the following survey question is used: “Some people feel they have completely free choice and control over their lives, while other people feel that what we do has no real effect on 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”. An aggregate control component is determined by averaging all the individual responses and multiplying by ten.

The third cultural trait – respect – is grounded in a distinction between generalized vs limited morality. Generalized morality refers to abstract rules which govern interactions across social groups resulting in less opportunistic behavior outside of an individual’s primary social group. In contrast, limited morality refers to the absence of general rules and the existence of “in-group” rules. The result is that opportunistic behavior outside an individual’s primary social network is more likely under limited morality given the absence of general and widespread rules to govern interactions. The level of respect for others serves as a proxy for the level of generalized vs limited morality. The following survey question is analyzed to determine the importance of respect in a society: “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.” Respect is defined as the percentage of respondents in each country that mentioned the quality “tolerance and respect for other people,” as being important.

The fourth and final cultural trait captures the importance of obedience in a society. In order to capture the level of obedience, the above question measuring respect is also utilized. Obedience is defined as the percentage of respondents within a country answering that obedience is an important quality for children to learn.

In order to maximize our number of periods for the panel data, the culture variable is constructed as follows. The first wave of surveys (1981-1984) 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 to 1999 is used to create culture for the period 1994. The fourth wave from 1999 to 2001 represents the culture variable for 1999 and the latest wave is used to create the culture variable for the period 2004.

Country	1984	1989	1994	Culture		Average	Rank
				1999	2004		
Albania			2.73	3.44		3.08	70
Algeria				1.44		1.44	87
Andorra					5.61	5.61	17
Argentina	4.23	5.32	4.70	4.22	4.25	4.54	30
Armenia			3.58			3.58	56
Australia	5.50		6.83		7.54	6.62	8
Austria		5.73		6.47		6.10	14
Azerbaijan			3.53			3.53	59
Bangladesh			4.90	4.74		4.82	24
Belarus			2.94	4.79		3.87	48
Belgium	3.40	4.69		4.97		4.35	37
Bosnia and Herzegovina			3.21	3.31		3.26	68
Brazil		3.11	1.57		2.58	2.42	76
Bulgaria		3.76	3.31	4.68		3.25	52
Burkina Faso					1.12	1.12	89
Canada	6.05	7.56		6.73		6.78	7
Chile		4.08	3.40	3.78	3.63	3.72	53
China		7.82	4.88	7.69	6.84	6.81	6
Colombia			3.79		4.04	3.92	45
Croatia			4.83			4.83	22
Cyprus					3.54	3.54	58
Czech Republic		5.15	5.21	5.11		5.16	19
Denmark	6.71	8.08		9.36		8.05	2
Dominican Republic			3.90			3.90	47
Egypt, Arab Republic				3.10	1.77	2.44	75
El Salvador			2.07			2.07	79
Estonia		5.36	3.71	4.34		4.47	33
Ethiopia					1.74	1.74	86
Finland		8.40	7.58	7.80	7.91	7.92	3
France	4.53	3.51		4.97	4.69	4.42	35
Georgia			3.57			3.57	57
Germany	4.50	5.90	7.50	6.80	6.41	6.22	12
Ghana					1.04	1.04	90
Greece				4.78		4.78	26
Hong Kong, China					3.80	3.80	49
Hungary	2.96	3.28	4.01	3.78		3.51	61
Iceland	6.27	5.26		7.71		6.41	10
India		3.05	2.05	3.06	1.78	2.49	73
Indonesia				4.50	3.89	4.20	41
Iran, Islamic Republic				4.85	3.67	4.26	40
Iraq				3.43	3.16	3.29	65
Ireland				4.97		4.97	20
Italy	2.65	4.66		5.37	5.16	4.46	34
Japan	4.66	5.58	6.30	6.79	6.81	6.03	15

(continued)

Table AII.
Culture index by country
and year

Country	1984	1989	1994	Culture 1999	2004	Average	Rank
Jordan				4.11	4.01	4.06	43
Korea, Republic	2.95	5.63		5.83	5.43	4.96	21
Kyrgyz Republic				3.79		3.79	50
Latvia		5.08	4.85	4.29		4.74	27
Lithuania		4.61	3.69	4.29		4.20	42
Luxembourg				5.65		5.65	16
Macedonia, FYR			4.15	4.93		4.54	31
Malaysia					4.64	4.64	28
Mali					1.94	1.94	83
Malta	1.83	1.93		3.75		2.50	72
Mexico		4.37	3.65	3.70	4.01	3.93	44
Moldova			3.13	3.54	5.03	3.90	46
Morocco				2.77	1.33	2.05	81
Netherlands	5.01	6.95		8.30	6.00	6.57	9
New Zealand			7.79		7.92	7.86	4
Nigeria		2.54	1.65	1.87		2.02	82
Norway	4.85	6.95	7.41			6.40	11
Pakistan				1.93		1.93	84
Peru			2.09	2.57	2.29	2.32	77
Philippines			1.68	2.45		2.06	80
Poland		4.56	0.00	4.53	4.06	3.29	66
Portugal		3.56		3.15		3.36	64
Puerto Rico			3.52	3.47		3.49	62
Romania		3.81	5.22	3.86	5.05	4.49	32
Russian Federation		5.48	3.68	3.61	4.48	4.31	39
Rwanda					0.25	0.25	92
Saudi Arabia				3.26		3.26	67
Serbia and Montenegro			3.19	2.88	2.77	2.95	71
Singapore				3.49		3.49	62
Slovak Republic		3.35	4.13	3.40		3.63	55
Slovenia		3.82	4.54	5.11	5.01	4.62	29
South Africa		3.69	2.95	2.98	4.45	3.52	60
Spain	3.72	4.76	4.35	4.84	4.25	4.38	36
Sweden	7.85	9.15	9.15	9.79	10.00	9.19	1
Switzerland		7.19	6.96		8.42	7.52	5
Taiwan			5.15	1.32	6.56	4.34	38
Thailand					3.75	3.75	51
Trinidad and Tobago					2.46	2.46	74
Turkey			1.36	2.28	3.06	2.23	78
Uganda				0.57		0.57	91
Ukraine			3.22	3.51	2.53	3.09	69
UK	5.00	6.02		4.95	5.34	5.33	18
USA	5.14	6.39	5.75	6.57	6.79	6.13	13
Uruguay			4.83			4.83	22
Venezuela, RB			2.96	4.45		3.70	54
Vietnam				4.37	5.23	4.80	25
Zambia					1.30	1.30	88
Zimbabwe				1.74		1.74	85

Table AII.

Variable	# observations	Mean	SD	Minimum	Maximum
Area	1,624	633,453.6	1,638,131	50	16,400,000
Area (log)	1,624	11.17	2.76	3.91	16.61
Control	229	67.12	8.82	0.00	83.83
Culture index (PCA)	228	4.82	1.82	0.00	10.00
Culture index (sum)	228	4.46	1.88	0.00	10.00
Democracy (100-year lag)	553	2.70	2.99	0.00	10.00
GDP	915	209,000,000,000.00	727,000,000,000.00	158,000,000.00	10,100,000,000,000.00
GDP (log)	915	23.94819	2.12341	18.87811	29.94356
GDPPC	915	7,870	8,159	488	59,880
GDPPC (log)	915	8.416177	1.106401	6.190643	11.0001
Growth	1,252	3.65	4.64	-42.45	35.89
Obedience	234	35.96	17.22	2.24	81.74
Openness-current (five lag)	383	52.65	26.19	0.00	100.00
Openness-current (six lag)	471	52.64	26.14	0.00	100.00
Openness-SW (five lag)	439	0.32	0.45	0.00	1.00
Openness-SW (six lag)	548	0.32	0.45	0.00	1.00
Openness-capital (five lag)	383	52.69	28.44	0.00	100.00
Openness-capital (six lag)	471	51.98	28.00	0.00	100.00
Population	1,767	23,400,000.00	93,700,000.00	16,000.00	1,280,000,000.00
Population (log)	1,767	15.03	2.12	9.68	20.97
Respect	234	67.22	13.21	14.23	93.71
Trust	235	28.47	14.63	2.80	66.10
Urban	1,845	47.38	25.19	2.25	100.00

Table AIII.
Summary statistics –
panel data

Table AIV.
Correlation matrix –
panel data

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) Culture (sum)	1.00													
(2) Culture (PCA)	0.98	1.00												
(3) Openness-capital (five lag)	0.29	0.23	1.00											
(4) Openness-currency (five lag)	0.41	0.36	0.88	1.00										
(5) Openness-SW (five lag)	0.50	0.44	0.43	0.49	1.00									
(6) Openness-capital (six lag)	0.18	0.10	0.87	0.76	0.32	1.00								
(7) Openness-Currency (six lag)	0.33	0.25	0.79	0.88	0.42	0.86	1.00							
(8) Openness-SW (six lag)	0.44	0.37	0.40	0.48	0.79	0.43	0.52	1.00						
(9) Growth	-0.10	0.06	-0.49	-0.55	-0.24	-0.38	-0.44	-0.23	1.00					
(10) Population (log)	-0.16	0.15	-0.11	-0.10	-0.14	-0.10	-0.13	-0.02	0.32	1.00				
(11) Area (log)	-0.13	0.12	-0.04	0.00	-0.26	0.03	0.04	-0.11	0.22	0.66	1.00			
(12) GDP (log)	0.17	0.15	0.22	0.28	0.28	0.14	0.16	0.33	0.00	0.83	0.48	1.00		
(13) Urban	0.18	0.10	0.50	0.46	0.16	0.46	0.14	0.09	-0.49	-0.34	-0.07	-0.01	1.00	
(14) Democracy (100-year lag)	0.26	0.24	0.33	0.31	0.45	0.33	0.29	0.48	-0.14	-0.06	0.01	0.23	0.29	1.00

	Dependant variable: trade openness					
	Panel			Cross		
	1	2	3	1	2	3
Trade instrument (1 pd. lag openness)	0.037* (0.009)	0.533* (0.050)	0.576* (0.054)	0.993* (0.011)	0.979* (0.010)	0.963* (0.037)
Constant	20.593* (0.507)	24.700* (3.320)	0.222* (0.053)	2.503* (0.596)	1.909* (0.600)	0.020 (0.024)
Wald statistic	115	116	116			
<i>p</i> -value	0.00	0.00	0.00			
<i>F</i> -statistics				14.60	23.05	36.60
Adjusted <i>R</i> ²				0.23	0.35	0.33
Number of observations	144	144	157	55	55	64

Note: *Significance level at 1 percent

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Table AV.
First stage results

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