Individualism, innovation, and long-run growth

Yuriy Gorodnichenko[a,b] and Gerard Roland[a,c,1]

[a]Department of Economics, University of California, Berkeley, CA 94720; [b]National Bureau of Economic Research, Cambridge, MA 02138; and [c]Center for Economic Policy Research, London EC1V 3PZ, United Kingdom

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Countries having a more individualist culture have enjoyed higher long-run growth than countries with a more collectivist culture. Individualist culture attaches social status rewards to personal achievements and thus, provides not only monetary incentives for innovation but also social status rewards, leading to higher rates of innovation and economic growth.

collectivism | institutions

The idea that culture is a central ingredient of economic development goes back to at least Max Weber, who, in his classical work "The Protestant Ethic and the Spirit of Capitalism," argued that the Protestant ethic of Calvinism was a powerful force behind the development of capitalism in its early phases. In our research (1, 2), we propose both a theoretical model and empirical evidence showing that countries with a more individualist culture have more innovation, higher productivity and higher long-run growth than countries with a more collectivist culture. This note provides an overview of our research.

Theory

The main tenets of our theory are as follows. Individualism emphasizes personal freedom and achievement. Individualist culture, therefore, awards social status to personal accomplishments such as important discoveries, innovations, or great artistic achievements. However, individualism can make collective action more difficult, because individuals pursue their own interest without internalizing collective interests. Collectivism, in contrast, makes collective action easier in the sense that individuals internalize group interests to a greater degree. However, it also encourages conformity and discourages individuals from standing out. This framework implies that individualism should encourage innovation more, but collectivism should have an advantage in coordinating production processes and various forms of collective action.

We put these ingredients in an endogenous growth model. The model has two sectors. Final goods sector is competitive and produces final goods using labor and intermediate inputs. Collectivist culture is assumed to give a competitive edge in the production of final goods, because collectivism makes coordinated actions easier. Production of the final goods is also greater when the quality of intermediate inputs is higher. The intermediate goods sector is populated by entrepreneurs who produce differentiated, imperfectly substitutable inputs for the production of final goods. Entrepreneurs derive utility not only from consumption but also from social prestige associated with producing a higher than average quality of intermediate products. This social prestige is stronger in individualistic cultures than collectivist cultures. The quality of intermediate inputs is determined by the effort put into research, which in turn, is a function of the monetary and social status rewards to innovation.

In this simple theoretical setting, we find that, ceteris paribus, although collectivism's increased coordination capacities lead to higher efficiency in the economy, individualism results in higher innovation; in an individualist culture, individuals have not only a monetary reward from innovation but also a social status reward, and thus, they allocate more labor to innovative activities. As a result, the higher innovation rate in an individualist culture eventually leads to higher levels of productivity and output in the long run than a collectivist culture. In other words, although the advantages of collectivism affect static efficiency in the economy, the advantages of individualist culture affect dynamic efficiency and thus, long-run growth.*

The model also yields an interesting relationship between culture and institutions. Under bad institutions, a predatory government can seize the monetary returns from innovation. However, social status and prestige cannot be expropriated. Therefore, even in societies where institutions are relatively predatory, there will be more innovation in an individualist culture because of the social status reward to innovation.

Empirical Analysis

How do we bring these predictions to the data? Our baseline measure of individualistic culture is a set of scores developed by Dutch sociologist Geert Hofstede (3).† Initially, Hofstede (3) surveyed IBM employees in about 30 countries to understand differences in corporate culture across the world. However, additional surveys were conducted with other professions and expanded to 80 countries. To avoid cultural biases in the way that the questions were framed, the translation of the survey into local languages was done by a team of English and local language speakers. The individualism score measures the extent to which it is believed that individuals are supposed to take care of themselves as opposed to being strongly integrated and loyal to a cohesive group. Individuals in countries with a high level of the individualism index value personal freedom and status, whereas individuals in countries with a low level of the index value harmony and conformity. A broad array of survey questions is used to establish cultural values in different countries. Factor analysis is used to summarize the data and construct the individualism score. The latter is the first component in a principal component analysis, and it loads positively on valuing individual freedom, opportunity, achievement, advancement, and recognition and negatively on valuing harmony, cooperation, and relations with superiors. The measure of individualism by Hofstede (3) has been validated in a number of studies. For example, across various studies and measures of individualism, the United Kingdom, the United States, and The Netherlands are consistently among the most individualistic countries, whereas Pakistan, Nigeria, and Peru are among the most collectivist countries.

We also use the database established by cross-cultural psychologist Shalom Schwartz (4), which was built with the purpose of establishing a core set of values that have a common cross-

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[1]To whom correspondence should be addressed. E-mail: groland@econ.berkeley.edu.

*In a Malthusian economy, however, where all resources were devoted to survival consumption, the collectivist economy will exhibit a higher level of output per capita.

†The data can be downloaded from the following website: http://www.geert-hofstede.com/.

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cultural meaning. Schwartz (4) gathered survey responses from kindergarten to grade 12 schoolteachers and college students for a total of 195 samples drawn from 78 nations and 70 cultural groups between 1998 and 2000. Each sample generally consists of 180–280 respondents for a total of over 75,000 responses. The value survey by Schwartz (4) consists of 56 or 57 value items that ask respondents to indicate the importance of each as “a guiding principle in *my* life” (4). Similar to the individualistic–collectivist dimension of cultures in the work by Hofstede (3), the work by Schwartz (4) differentiates cultures along the autonomy and embeddedness dimensions. In autonomous cultures, people are viewed as autonomous, bounded entities. They are encouraged to cultivate and express their own preferences, feelings, ideas, and abilities and find meaning in their own uniqueness by pursuing their own ideas and intellectual directions independently (intellectual autonomy) and by pursuing positive experiences for themselves (affective autonomy). In contrast, meaning in life for people in embedded cultures comes largely through social relationships: identifying with the group, participating in its shared way of life, and striving to its shared goals. Embedded cultures emphasize maintaining the status quo and restraining actions that might disrupt in-group solidarity or the traditional order. Countries that score high on embeddedness also score low on intellectual and affective autonomy. Although measures of individualism in the works by Hofstede (3) and Schwartz (4) are based on different sources and indentifying procedures, the correlation between Hofstede’s (3) individualism score and Schwartz’s (4) autonomy embeddedness score is fairly high, ranging between 0.55 and 0.65. The key advantage of using Hofstede’s (3) measure relative to Schwartz’s (4) measures is that Hofstede’s (3) measure of individualism is 1D, whereas Schwartz (4) uses three (correlated) variables.

The counterpart of output in the model is the gross domestic product (GDP) per worker in 2000 reported in Penn World Tables, which provide measures of economic outcomes comparable across countries. The work by Klenow and Rodriguez-Clare (5) argues that this measure of output per worker should be a preferred metric of long-run growth. Our measures of the intensity of innovations are the log patents per million population and the innovation performance index from the Economist Intelligence Unit (EIU) (6, 7). EIU constructs patents per million population as the sum of patents granted to applicants (by residence) from the 82 economies by three major government patent offices—the European Patent Office, the Japanese Patent Office, and the US Patent and Trademark Office. Although the use of patent data has a number of problems, this measure is the single best available measure for innovation outputs. The innovation performance index incorporates information on patents and alternative indicators of innovation output, such as royalty and license fee receipts as a percentage of GDP, high-technology manufacturing output per head, high-technology services output per head, the number of citations from scientific and technical journals, etc.

When we regress the log of GDP per worker on individualism, we find a strong and significant positive effect of individualism (Fig. 1*A*), which is consistent with early results reported in the work by Hofstede (3). We report in the work by Gorodnichenko and Roland (1) that a 1 SD increase in individualism (say from the score of Venezuela to Greece or from the score of Brazil to Luxemburg) leads to a 60–87% increase in the level of income, which is a quantitatively large effect. We also observe strong positive correlations between individualism and measures of innovation (Fig. 1 *B* and *C*). The results are similar when we use Schwartz’s (4) measures of individualism.

The strong positive correlation between individualism on the one hand and measures of long-run growth and innovation on the other hand can be argued to be because of a causal effect of individualism on innovation and growth. One can, however, also

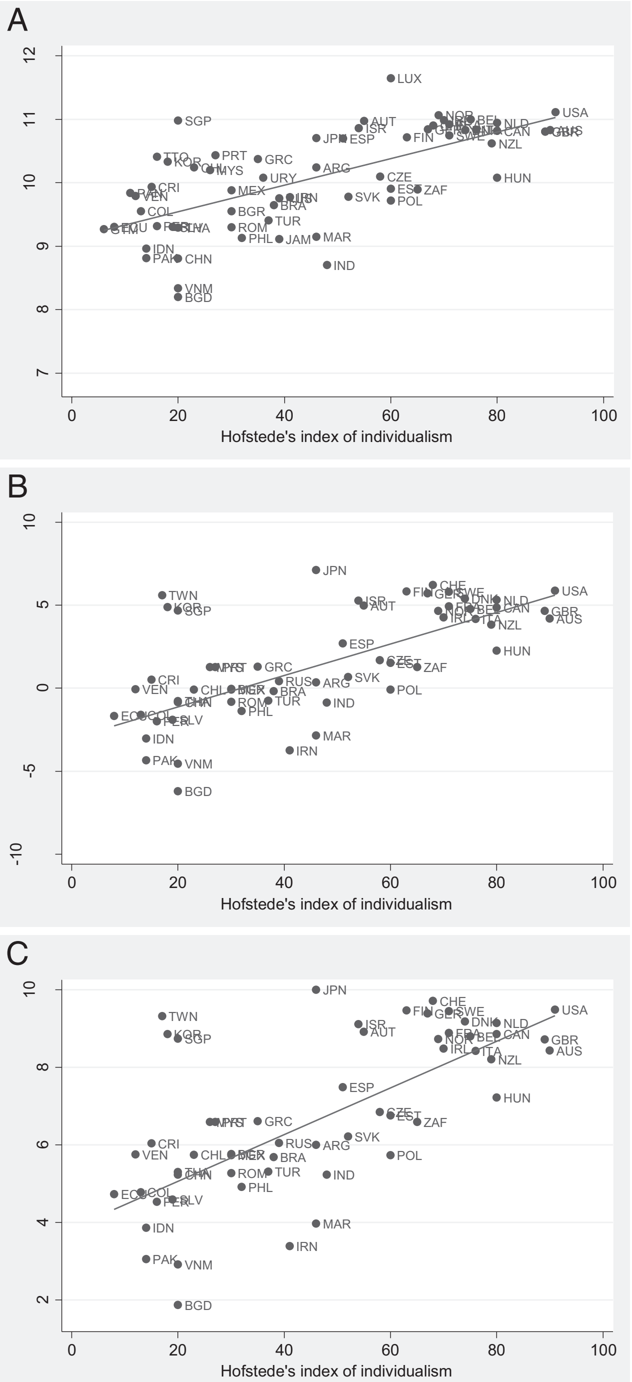

Fig. 1. Individualism is Hofstede’s index of individualism. A larger value of the index corresponds to a greater level of individualism. (*A*) Log income (at purchasing power parity) per worker is from the Penn World Tables. Log patents per million population (*B*) and innovation performance index (*C*) are taken from Economist Intelligence Unit (6, 7).

argue that there might be a reverse causality at work: when countries get richer, their cultures become more individualistic. To rule out reverse causality, we perform instrumental variable (IV) regression of long-run growth and innovation on individualism. Instrumental variable analysis helps estimate causal effects of the explanatory variable (individualism) on the dependent variable (long-run growth and innovation) by finding a variable that is correlated with the explanatory variable but not correlated with the dependent variable beyond its correlation through the explanatory variable. That is, the only relationship between the instrumental variable and the dependent variable is through the explanatory variable. The econometric estimate then accounts for the variation in long-run growth that is explained by the variation in individualism that is itself explained by the instrumental variable.

In the works by Gorodnichenko and Roland (1, 2), we use is a measure of genetic distance between countries as an IV. In particular, we use a measure of the Euclidian distance between the frequency of blood types in a given country and the frequency of blood types in the United States, which is the most individualistic country in our sample. The genetic data originate from the work by Cavalli-Sforza et al. (8), providing measures of genetic markers for roughly 2,000 groups of population across the globe. These data contain allele frequencies (alleles are variants taken by a gene) for various ethnic groups. We aggregate these data to country level using ethnic shares of population from the work by Fearon (9). We use these genetic data as an indirect measure of cultural transmission. Parents transmit their culture to their children but also transmit their genes. We do not have a direct measure of the former, but we do have measures of the latter. Our blood distance measure should, thus, be seen as a proxy measure of cultural transmission. To reiterate, we do not claim that blood distance has a causal effect on culture.

Why can blood distance be a good IV? As we discuss in Gorodnichenko and Roland (1), blood types are a neutral genetic marker, and thus, it is hard to argue that blood types can explain why some countries are richer than others. Neutral genetic markers are, by definition, not affecting general fitness and thus, should satisfy the exclusion restriction, because they should have no direct effect on economic productivity. Although genes might not, in general, satisfy the exclusion restriction, blood types, as neutral genetic markers, will. Indeed, blood types are not known to be correlated with alleles that affect ability to work, think, etc. If blood types were able to affect fitness, there would be what geneticists call linkage disequilibrium. The choice of blood type distance as an instrument should, thus, plausibly satisfy the exclusion restriction. If our genetic distance measure correlates well with our individualism score, then we will have a useful instrument. This case was, indeed, true (Fig. 2). There is a strong negative correlation between blood distance on one hand and the individualism score of Hofstede (3) and the affective and intellectual autonomy variables of Schwartz (4), which are closely

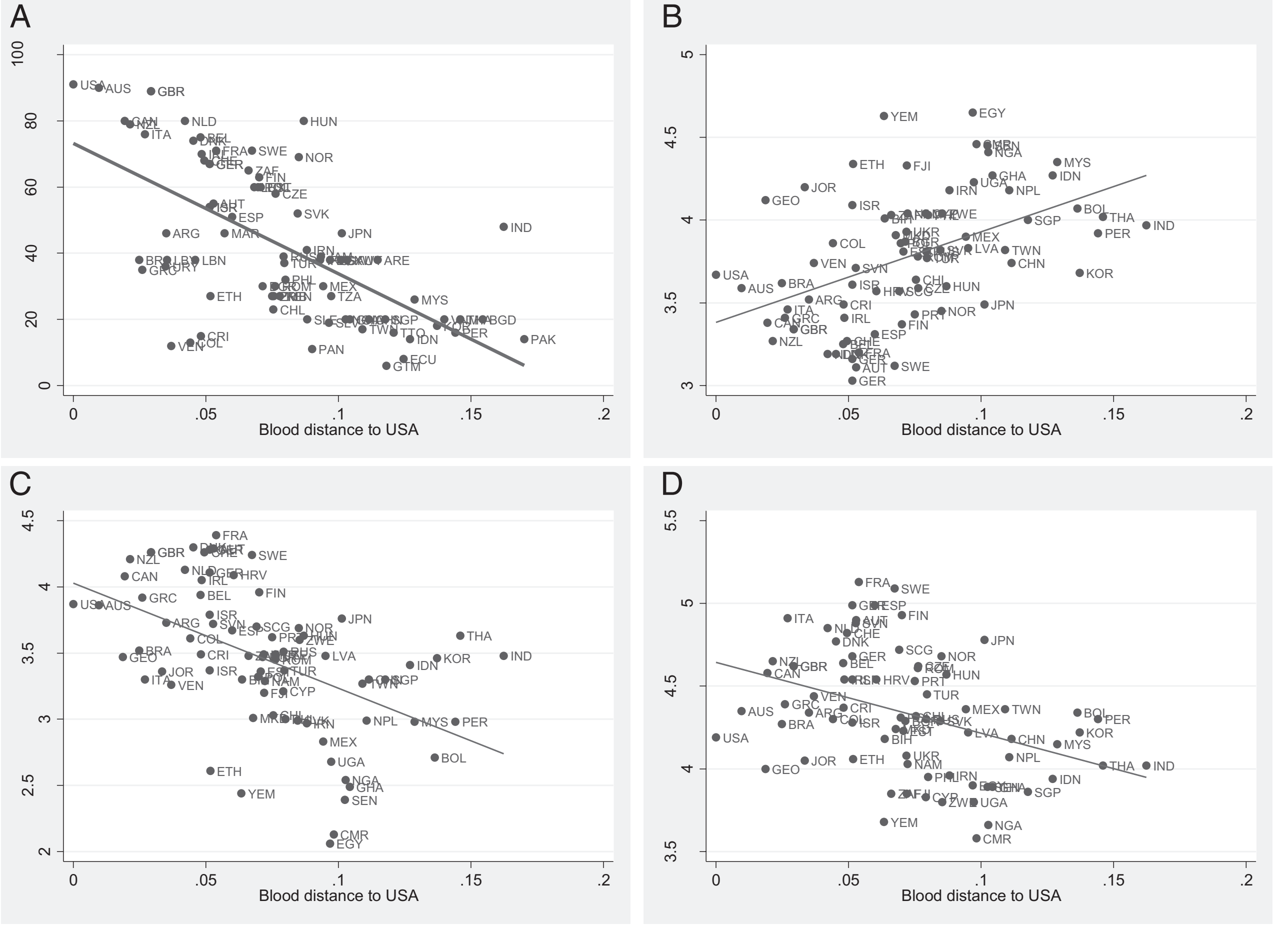

Fig. 2. In all panels, blood distance to United States (horizontal axis) is the Euclidian distance of frequency of blood types A and B in a given country relative to the frequency of blood types A and B in the United States. (*A*) Hofstede's index of individualism is on the vertical axis. A larger value of the index corresponds to a greater level of individualism. (*B*) Schwartz's measure of embeddedness is on the vertical axis. In embeddedness cultures, people are viewed as entities embedded in the collectivity. A smaller value of embeddedness corresponds to a greater level of individualism. (*C*) Schwartz's measure of affective autonomy is on the vertical axis. Affective autonomy encourages individuals to pursue affectively positive experiences for themselves. (*D*) Schwartz's measure of intellectual autonomy is on the vertical axis. Intellectual autonomy encourages individuals to pursue their own ideas and intellectual directions independently. A larger value of intellectual autonomy and affective autonomy corresponds to a greater level of individualism. Schwartz's intellectual autonomy, affective autonomy, and embeddedness are taken from the work by Licht et al. (10).

correlated with individualism, on the other hand; there is also a positive relationship between Schwartz's (4) measure of embeddedness, which is closely correlated with collectivism.

Having shown that blood distance is a strong predictor of individualism scores, we perform IV estimation and find results similar, if not stronger, to estimates obtained in least squares regressions. Thus, we can exclude reverse causality. However, it might still be the case that blood distance affects long-run growth through other channels than individualism and collectivism. To address these concerns, we control for a variety of additional factors, use a series of subsample analyses, and use alternative instrumental variables [the work by Gorodnichenko and Roland (1) has more robustness checks].

First, we rule out colonization effects by showing that the effect of individualism on long-run growth still works when we exclude countries in the Americas and Oceania, where there was important settler colonization after 1500. The effect of individualism holds at the level of individual continents and even if we look only at European and/or developed countries that are members of the Organization for Economic Cooperation and Development.

Second, other possible channels might be institutions, human capital, or other measures of individualism and geographical distance.[‡] Indeed, one can argue that these variables may be correlated with our measure of genetic distance. Even if we control for those variables, we find that individualism still has an important effect on output per worker and innovation. Likewise, our results do not change in any material way when we control for measures of ethno-linguistic fractionalization, legal origins, and geographical controls, such as distance from the equator or being landlocked. More generally, our results are robust to using other measures of genetic distance, other distance metrics, blood distance to other countries, blood frequencies as separate instruments, and other instrumental variables, such as linguistic variables [e.g., pronoun drop dummy, which is based on evidence in the work by Kashima and Kashima (12) that cultures with languages prohibiting pronoun drops are more individualistic].

Third, one may conceive that it is some other cultural dimension correlated with individualism that really affects innovation and output per worker. We find that generalized trust, a measure often used in previous research on culture, has no significant effect on long-run growth. Furthermore, in the work by Gorodnichenko and Roland (2), we look at a broad spectrum of other available measures of culture and conclude that there is no significant or robust effect on growth from cultural dimensions that are independent from the individualism–collectivism cleavage.

Finally, we use recent advances in cross-cultural psychology, which provides some direct evidence of an effect of genes on culture, to verify the causal effect of individualism on long-run growth. Three separate research strands can be brought together here. First, it has been found that collectivism is stronger in countries where a higher percentage of people have a short allele in the polymorphism 5-HTTLPR of the serotonin transporter gene SLC6A4, putting them at greater risk for depression when exposed to life stressors. Second, collectivism is also stronger in countries with a higher frequency of the G allele in polymorphism A118G in the μ-opoid receptor gene, leading to higher stress in case of social rejection. Third, collectivism is also stronger in countries with historically higher pathogen prevalence (i.e., in countries more prone to a number of important diseases). Studies establishing these links emphasize that collectivism provides strong psychological support networks to deal with depression and stronger protection from social rejection. Similarly, more collectivist values emphasizing tradition, putting stronger limits on individual behavior, and showing less openness to foreigners provide protection against disease spread. Using these three variables, in turn, as instruments, we find robust and significant effects of individualism on log output per worker. It might be less clear a priori whether these variables satisfy the exclusion restriction. However, when we use each of these instrumental variables jointly with our other instrumental variable of blood distance, the overidentifying restriction tests cannot reject the exclusion restriction and thus, at least on statistical grounds, we cannot reject the validity of these additional instrumental variables.

Conclusion

It is a fascinating task to study and try to understand the effects of culture on economic development and economic performance. We reported here on our theoretical and empirical research on the effects of individualism and collectivism on innovation and long-term growth. The individualism–collectivism cleavage may also affect other important economic and institutional variables, such as comparative advantage and specialization in trade, public good provision, and the form of government institutions. These questions are the object of the additional research that we are undertaking.

[‡]We also find that institutions, measured by average protection against expropriation risk [the variable used in the famous work by Acemoglu et al. (11)] on the effect of institutions on long-run growth, can be explained by our individualism score, but institutions also seem to affect culture. Culture and institutions, thus, influence each other mutually. Culture and institutions, together with measures of human capital, play an important role in explaining long-run growth.

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