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# The effect of culture on fiscal redistribution: Evidence based on genetic, epidemiological and linguistic data

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**Abstract:** Using a set of innovative instruments we investigate the effect of collectivist culture on fiscal redistribution. Our analysis suggests that societies characterized by less collectivistic culture present higher levels of fiscal redistribution, as proxied by government subsidies and transfers as well as health and education expenses.

**JEL:** Z10, Z13, H40, H41

**Keywords:** Culture, Redistribution, Public goods

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## 1. Introduction

Numerous theoretical and empirical studies suggest that culture affects economic outcomes and institutions within countries (see Guiso et al., 2006; Spolaore and Wacziarg, 2013). However, contemporaneous culture might be endogenous to economic outcomes and institutions. In a highly influential paper Gorodnichenko and Roland (2016) employ a set of innovative instruments (e.g., distance in terms of frequencies of blood types) in order to address endogeneity concerns and, thus, establish a convincing causal effect from culture to growth.

Based on the identification strategy of Gorodnichenko and Roland (2016), this work examines the effect of culture on fiscal redistribution. The latter is proxied by the most direct fiscal measure of redistribution, namely subsidies and transfers, as well as health and education expenses that entail a dimension of redistribution (see Desmet et al., 2009). To deal with the usual identification concerns driven from the fact that social values and culture may be endogenous to fiscal institutions and the implemented fiscal policy, we instrument culture by a set of genetic, epidemiological and linguistic data that have been linked empirically to collectivism. Our analysis suggests that countries characterized by higher levels of individualism present higher levels of redistributive spending.

## 2. Data and estimation strategy

### 2.1 Data

Our data covers a wide cross-section of countries. The dependent variables in our analysis are specific fiscal spending accounts that are characterized as redistributive by the relevant literature (e.g., Desmet et al. 2009). Specifically, we employ as dependent variable interchangeably: (i) government subsidies and transfers (% GDP) and (ii) health and education expenses (% GDP) from 1980-2004.<sup>1</sup>

The key explanatory variable in our analysis is *culture*. We focus on one dimension of culture which is expected to affect preferences for redistribution: individualism versus collectivism. Individualism is a cultural trait that emphasizes personal freedom and achievement and awards social status to personal accomplishments that make an individual stand out. On the other hand, collectivism emphasizes the embeddedness of individuals in larger groups and

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<sup>1</sup> Data for these variables are obtained from the World Bank's *World Development Indicators (WDI)*

encourages conformity to “in-group” relationships (see Triandis, 1995). Our analysis employs, as a main proxy for individualistic/collectivistic culture, the measure developed by Hofstede (2001).

The main empirical specification controls for the level of development as proxied by GDP per capita. As a robustness check we employ a set of extended controls to account for other potential confounding factors (see Desmet et al., 2009). Thus, we control for: continental effects, legal origins, percentages of population practicing major religions in a country, population, share of population above 65, ethno-linguistic fractionalization and absolute latitude. Economic and demographic control variables are obtained from the *WDI*, whereas the remaining controls (i.e. geographical variables, legal origins, major religions etc.) are taken from Gorodnichenko and Roland (2016).

## **2.2 Identification Strategy**

Our analysis relies on contemporaneous measures of culture which might be endogenous to the implemented economic policy. To address the usual endogeneity concerns we instrument culture by employing a series of genetic, epidemiological and linguistic data that have been linked empirically to collectivism (see Kashima and Kashima, 1998; Murray and Schaller, 2010; Way and Liebermann, 2010).

Following Gorodnichenko and Roland (2016) our basic instrument is the Mahalanobis distance between the frequency of blood types in a given country and the frequency of blood types in the UK, which is the second most individualistic country in our sample - denoted as *blood distance from the UK*.<sup>2</sup> Second, we use the epidemiological data on pathogen prevalence put together by Murray and Schaller (2010) - denoted as *pathogen prevalence*. The rationale behind the use of epidemiological data is that stronger pathogen prevalence pushed communities to follow collectivist traits that emphasize the embeddedness of individuals to “in-group” relationships and set limits to openness towards foreigners (e.g., Murray and Schaller, 2010). Third, we employ the G allele in polymorphism A118G in the  $\mu$ -opoid receptor gene that leads to higher stress in case of social rejection (denoted as *A118G*). According to Way and Liebermann (2010) the G allele in polymorphism A118G in the  $\mu$ -opoid receptor gene is strongly correlated to the collectivistic traits that provide psychological protection from social rejection. It must be

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<sup>2</sup> The advantage of using distance relative to the UK is that UK’s population is genetically more homogeneous than the population of the USA (which appears to be the most individualistic country in the world) and that UK is often described as the cradle of individualism.

emphasized that employing genetic data does not postulate any kind of causal effect between genetic distance and cultural distance. Genetic markers are used solely as a proxy for transmission of cultural traits from parents to offspring. In other words, our analysis seeks to exploit the stylized fact that culture is transmitted from parents to offspring (similarly to the genes) and takes the advantage of this correlation between cultural and genetic transmission so as to investigate the cultural distances that cannot be proxied in a more direct way.

Apart from the genetic and epidemiological data, we employ the linguistic variable on pronoun drop developed by Licht et al. (2007) as instrument for cultural emphasis on autonomy rather than on in-group embeddedness. According to Kashima and Kashima (1998), the requirement to use pronouns in a language or the license to drop them is linked to the degree of psychological differentiation between the speaker and the social context of speech, including the conversation partner. Therefore, the linguistic practice of “*pronoun drop*” reveals a cultural dimension of central interest, namely the relationship between the individual and the group. Cultures with pronoun drop languages tend to be less individualistic. In turn, we employ the linguistic dummy *language* developed by Tabellini (2008) that takes into account both the pronoun drop and the type of second type pronoun (the so-called “*T-V distinction*”). In many Indo-European countries, there are two types of second person pronouns (T and V types) which originated from *tu* and *vos* in Latin. Earlier in history, a higher status person called a lower status person by T, whereas the lower status addressed the higher status by V. Linguists point out that this T-V distinction is associated with cultures that pay close attention to the hierarchy of interpersonal relations. Therefore, cultures with T-V distinction languages tend to be less individualistic (see Kashima and Kashima, 1998).

### **3. Results**

Table 1 presents the OLS and IV estimates from the basic specification when the dependent variable is: (i) government subsidies and transfers (% GDP) [Panel A] and health and education expenses (% GDP) [Panel B]. Specifically, columns (1)-(2) present the OLS estimates and columns (3)-(12) our IV estimates when we instrument culture by employing the data described above. As can be easily verified *individualism* enters with a positive and highly significant coefficient in all alternative specifications. This empirical finding can be interpreted as follows. In collectivist societies there are extended networks of “in-group” relationships (e.g. stronger family

ties) that act as a social security net for the individuals making the redistributive policy of the state less necessary and therefore the demand for redistribution weaker. Moreover, collectivist societies are characterized by stronger “in-group” ties and therefore weaker generalized preferences for redistribution (i.e., redistribution that is in favor of an unknown, “out-group” individual).

Table 2 presents OLS and IV estimates for the basic instrument of our analysis, namely *blood distance from the UK*, when employing an extended set of controls identical to that of Desmet et al., (2009). As can be seen, individualism enters again with a positive and significant coefficient in all alternative specifications.

#### **4. Conclusions**

Building on the identification strategy employed by Gorodnichenko and Roland (2016) our analysis seeks to provide a convincing causal effect of culture on implemented fiscal policy. Our empirical findings suggest that countries characterized by more individualistic cultural values present higher levels of fiscal redistribution.

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**Table 1: The effect of culture on fiscal redistribution**

|   | (1)                 | (2)                 | (3)                             | (4)                 | (5)                      | (6)                 | (7)                 | (8)                 | (9)                 | (10)                | (11)                | (12)                |
|---|---------------------|---------------------|---------------------------------|---------------------|--------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
|   | OLS                 | OLS                 | IV (blood distance from the UK) |                     | IV (pathogen prevalence) |                     | IV (A118G)          |                     | IV (pronoun drop)   |                     | IV (language)       |                     |
| <b>Panel A: government subsidies and transfers (%GDP)</b> |                     |                     |                                 |                     |                          |                     |                     |                     |                     |                     |                     |                     |
| <b>Individualism</b>                                      | 0.273***<br>(0.036) | 0.195***<br>(0.044) | 0.360***<br>(0.058)             | 0.312**<br>(0.122)  | 0.411***<br>(0.054)      | 0.474***<br>(0.127) | 0.415***<br>(0.062) | 0.454***<br>(0.082) | 0.315***<br>(0.051) | 0.293***<br>(0.072) | 0.222***<br>(0.054) | 0.170**<br>(0.067)  |
| <b>GDP per capita</b>                                     |                     | 1.853***<br>(0.532) |                                 | 0.701<br>(1.233)    |                          | -0.887<br>(1.303)   |                     | -1.403<br>(1.330)   |                     | 0.546<br>(0.789)    |                     | 1.947**<br>(0.770)  |
| <b>Observations</b>                                       | 83                  | 83                  | 83                              | 83                  | 83                       | 83                  | 33                  | 33                  | 61                  | 61                  | 61                  | 61                  |
| <b>R<sup>2</sup></b>                                      | 0.486               | 0.543               | 0.437                           | 0.490               | 0.361                    | 0.244               | 0.297               | 0.252               | 0.533               | 0.547               | 0.516               | 0.548               |
| <b>F-stat</b>   |                     |                     | 39.22                           | 8.122               | 94.40                    | 16.43               | 19.45               | 32.76               | 88.35               | 40.03               | 43.32               | 47.29               |
| <b>Panel B: health and education expenses (%GDP)</b>      |                     |                     |                                 |                     |                          |                     |                     |                     |                     |                     |                     |                     |
| <b>Individualism</b>                                      | 0.091***<br>(0.009) | 0.057***<br>(0.012) | 0.135***<br>(0.019)             | 0.128***<br>(0.046) | 0.131***<br>(0.015)      | 0.113***<br>(0.030) | 0.107***<br>(0.020) | 0.079***<br>(0.021) | 0.115***<br>(0.014) | 0.097***<br>(0.020) | 0.100***<br>(0.015) | 0.086***<br>(0.019) |
| <b>GDP per capita</b>                                     |                     | 0.761***<br>(0.195) |                                 | 0.096<br>(0.442)    |                          | 0.234<br>(0.302)    |                     | 0.838***<br>(0.240) |                     | 0.445*<br>(0.259)   |                     | 0.567**<br>(0.250)  |
| <b>Observations</b>                                       | 91                  | 91                  | 91                              | 91                  | 91                       | 91                  | 33                  | 33                  | 64                  | 64                  | 64                  | 64                  |
| <b>R<sup>2</sup></b>                                      | 0.485               | 0.578               | 0.376                           | 0.410               | 0.395                    | 0.473               | 0.577               | 0.714               | 0.539               | 0.613               | 0.563               | 0.637               |
| <b>F-stat</b>   |                     |                     | 43.08                           | 9.736               | 107.1                    | 17.66               | 22.47               | 31.21               | 94.83               | 38.63               | 39.78               | 51.56               |

**Notes:** The table shows two panels one for each of the two dependent variables, *government subsidies and transfers* and *health and education expenses*. The F-stat is the F statistic for the explanatory power of the excluded instrument(s) in first stage regressions. Robust standard errors are in parentheses. \*\*\* (\*\*, \*) denotes statistical significance at the 1 (5, 10) percent level.



**Table 2: The effect of culture on fiscal redistribution: Extended set of controls**

|   | (1)                                       | (2)                             | (3)                 | (4)                 | (5)                                  | (6)                             | (7)                  | (8)                  |
|---|---|---------------------------------|---------------------|---------------------|--------------------------------------|---------------------------------|----------------------|----------------------|
|   | government subsidies and transfers (%GDP) |                                 |                     |                     | health and education expenses (%GDP) |                                 |                      |                      |
|   | OLS                                       | IV (blood distance from the UK) |                     |                     | OLS                                  | IV (blood distance from the UK) |                      |                      |
| <b>Individualism</b>                      | 0.184***<br>(0.054)                       | 0.222***<br>(0.074)             | 0.103**<br>(0.049)  | 0.122**<br>(0.053)  | 0.053***<br>(0.016)                  | 0.102***<br>(0.021)             | 0.107***<br>(0.031)  | 0.120***<br>(0.035)  |
| <b>GDP per capita</b>                     | 0.458<br>(1.012)                          | 0.341<br>(0.920)                | 0.722<br>(0.668)    | 0.895<br>(0.769)    | 0.885***<br>(0.193)                  | 0.376*<br>(0.226)               | 0.337<br>(0.303)     | 0.413<br>(0.284)     |
| <b>Ethno-linguistic fractionalization</b> | -4.780*<br>(2.594)                        | -5.795**<br>(2.926)             | -4.834**<br>(2.427) | -4.487**<br>(2.230) | -0.974<br>(0.963)                    | -1.283<br>(0.926)               | -1.343<br>(0.908)    | -1.190<br>(0.853)    |
| <b>Population</b>                         | -0.704<br>(1.175)                         | -0.900<br>(1.293)               | -0.130<br>(0.907)   | -0.210<br>(0.912)   | -1.019***<br>(0.370)                 | -1.360***<br>(0.328)            | -1.435***<br>(0.410) | -1.502***<br>(0.421) |
| <b>Population above 65</b>                | -0.197<br>(0.197)                         | 0.023<br>(0.191)                | -0.169<br>(0.153)   | -0.167<br>(0.168)   | 0.074<br>(0.052)                     | 0.027<br>(0.061)                | 0.018<br>(0.057)     | 0.020<br>(0.056)     |
| <b>Latitude</b>                           | -0.063<br>(0.068)                         | 0.045<br>(0.058)                | 0.014<br>(0.058)    | -0.015<br>(0.071)   | -0.030<br>(0.020)                    | -0.048***<br>(0.018)            | -0.058***<br>(0.022) | -0.074**<br>(0.029)  |
| <b>Legal Origins</b>                      | <b>Y</b>                                  | <b>Y</b>                        | <b>Y</b>            | <b>Y</b>            | <b>Y</b>                             | <b>Y</b>                        | <b>Y</b>             | <b>Y</b>             |
| <b>Continent dummies</b>                  | <b>Y</b>                                  | <b>N</b>                        | <b>Y</b>            | <b>Y</b>            | <b>Y</b>                             | <b>N</b>                        | <b>Y</b>             | <b>Y</b>             |
| <b>Religion</b>                           | <b>Y</b>                                  | <b>N</b>                        | <b>N</b>            | <b>Y</b>            | <b>Y</b>                             | <b>N</b>                        | <b>N</b>             | <b>Y</b>             |
| <b>Observations</b>                       | 68  | 68                              | 68                  | 68                  | 77                                   | 77                              | 77                   | 77                   |
| <b>R<sup>2</sup></b>                      | 0.847                                     | 0.712                           | 0.832               | 0.841               | 0.804                                | 0.749                           | 0.741                | 0.735                |
| <b>F-stat</b>                             |   | 26.87                           | 24.34               | 20.70               |                                      | 26.57                           | 20.25                | 15.86                |

**Notes:** The instrument is the blood distance from the UK. The F-stat is the F statistic for the explanatory power of the excluded instrument in first stage regressions. Robust standard errors are in parentheses. \*\*\* (\*\*, \*) denotes statistical significance at the 1 (5, 10) percent level.