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## *Human Development and Electoral Systems*

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**Abstract** The aim of this paper is to test whether electoral systems and human development are linked. Using high-quality data and very simple panel data econometric techniques, we show that electoral systems play a critical role in explaining the difference in the levels of human development between countries. We find that countries which have proportional systems enjoy higher levels of human development than those with majoritarian systems, thanks to more redistributive fiscal policies. We also find that when the degree of proportionality, based on the mean electoral district size, increases, so does human development.

**Key words:** Human Development, Welfare Expenditure, Electoral Systems

### **Introduction**

The concept of human development is much wider than that of poverty directly as related to income. It is a process enabling people to enlarge their choices, measured through a composite index covering three basic dimensions of human development: a decent living standard measured by Gross Domestic Product (GDP) per capita (purchasing per parity in US dollars), a long and healthy life measured by life expectancy at birth, and knowledge measured by the educational attainment rate (adult literacy rate and school enrolment rates). All these aspect are indispensable complements to financial well-being.

In addition, the concept of human development involves the recognition of the importance of economic, political and social liberties. Scholars have been interested in the latter concept since the *basic needs* approach was developed by the World Bank and by the International Labour Organization. Using a slightly different approach, Sen (1990) gave a new impetus to the study of welfare by considering the importance of individual capabilities, focusing on what a person really does as opposed

to what he/she could do, given his/her idiosyncrasies. As a result, in recent studies, welfare concepts are often privileged over the concept of poverty. The literature is also reaching a point where it is generally accepted that the success of a society should be measured by how economic goals are translated into practical opportunities for people, rather than just some global growth rate of per-capita income.

The role of government spending in improving human development has been considered by many authors (for example, Strauss and Thomas, 1995). What generally emerges is that redistributive expenditures, such as social security and welfare spending, are efficient in improving human development, while pure local public goods (often associated with pork-barrel politics) have a very poor poverty reduction effect (Ranis and Stewart, 2000). What we aim to show in this paper is that electoral systems influence the level of human development, through their effect on the breakdown of government spending: depending on the existing electoral system, politicians will choose the type of public expenditures they implement as a function of the key groups of voters they want to target to maximize their probability of being reelected. Indeed, re-election is strongly dependent on the rules of the system, which politicians know perfectly well. They define which electors they should try to attract.

Persson and Tabellini (1999, 2000) show, in the context of a Downsian model of electoral competition, that in larger districts,<sup>1</sup> electoral competition will be diffused since parties will seek support from broad coalitions of voters. By contrast, in smaller districts, competition will be concentrated in locally geographically determined constituencies, toward which spending will be oriented. In countries with large electoral districts, typically under proportional representation, politicians will favor broad redistributive policies. In countries with single member districts (or at least with very small mean district magnitude), typically those with majoritarian systems, politicians will favor local public goods spending. Note that even if the mean district magnitude is a good indicator of the degree of proportionality of an electoral system, there are notable exceptions — such as Ireland: its electoral system (Single Transferable Vote) is classified as proportional, but is associated with a rather low mean district magnitude.

For our analysis, it is important to stress that we use the *logarithm* of the mean district magnitude, which considerably reduces differences among proportional systems while maintaining the gap with respect to majoritarian ones: for example, the logarithm of the mean district magnitude of Ireland is 1.39, which is small, but much closer to that of Iceland, which is 2.08, than to that of the United Kingdom, which is 0.

Milesi-Ferretti *et al.* (2002) arrive at a similar conclusion to that of Persson and Tabellini, extending the strategic delegation model of Chari *et al.* (1997). They show that in large electoral districts, legislators represent nationwide, distributed socio-economic groups, targeting expenditures

towards them. In small districts they represent locally determined groups and prefer to target expenditures locally. In addition, in single member districts, the objective is to win 50% of the votes<sup>2</sup> in 50% of the districts.

On the other hand, under full proportional representation, a coalition of parties needs to win approximately 50% of the national vote,<sup>3</sup> leading politicians to internalize the benefit for a larger share of the population. As shown by Lizzeri and Persico (2001), this will end in more redistributive programs under proportional representation and more local public good expenditures in majoritarian systems. Given that several authors have proved the positive effect of redistributive spending on human development, we expect proportional representation systems to be associated with higher levels of human development than majoritarian ones.

Following this short introduction, in the next section we briefly review the literature linking electoral systems and human development. In the third section we present the methodology and the data we use. In the penultimate section we comment on our main results, followed by our conclusions in the final section.

## **Electoral systems and human development**

Several authors have tried to identify which factors play an important role in explaining the differences in the level of human development between countries. Ranis *et al.* (2000) show that economic growth is one of the most important features. Fields (1989), Deninger and Squire (1996) and Bruno *et al.* (1995) arrive at similar conclusions, adding that the reduction of poverty and human underdevelopment is dramatically linked to the level of income inequality. Lipton (1977), Ranis (1979) and Stewart (1977) show that the type of economic growth is important as well, since a growth process associated with unemployment reduction and increasing rural income is much more efficient in reducing poverty than a growth process based on intensive capital and urban development. As far as government spending is concerned, Strauss and Thomas (1995) show how government spending on social security<sup>4</sup> and welfare affects human development positively, using recently available micro-level data. It is thus extremely important to understand which factors determine the breakdown of government expenditures in order to be able to enforce clear poverty reduction strategies.

Our idea is that electoral systems have an effect on social security and welfare expenditures,<sup>5</sup> and thus on human development. The effect of electoral systems on redistributive spending has been analyzed by several authors. Persson and Tabellini (1999), in a two-party electoral system model, show that small electoral districts (typical of majoritarian systems) are associated with locally targeted expenditures since political competition is concentrated in geographically determined constituencies (districts), while large districts (typical of proportional systems) are associated with broad redistributive spending since parties seek the support of a wide

coalition of voters. Milesi-Ferretti *et al.* (2002) arrive at similar conclusions but with a different type of modeling. Starting from the assumption that elected politicians represent a specific locally determined group in small constituencies, while in large districts they represent large socio-economic groups, they show that in countries characterized by a majoritarian electoral rule and by many small electoral districts, public expenditures will mainly be composed of local public goods. Whereas in proportional systems, with a low number of large districts, they will be composed mainly of redistributive spending.

As stated in the Introduction, Lizzeri and Persico (2001) show that, given the well-known fact that the proportion of votes, which is necessary to have a majority in the assembly under proportional representation, is much higher than in majoritarian systems, this will result in more redistributive programs in proportional representation systems and more local public good expenditures in majoritarian ones. Given that most local public goods (such as pork barrel) do not generate externalities and are thus not redistributive, Verardi (2003) and Roland and Verardi (2005) suggest that proportional systems should be associated with lower levels of income inequality. Austen-Smith (2002), considering a model with an exogenous political structure, arrives at a similar conclusion. He shows that proportional systems are associated with more redistributive taxes than typical two-party majoritarian systems, implying less income inequality.

A similar reasoning can be adopted here: given that proportional systems are associated with more redistributive spending and that Strauss and Thomas (1995) have shown that redistributive spending reduces human underdevelopment, we expect proportional systems to be associated with higher levels of human development than majoritarian ones. The scope of this paper is to check whether this is confirmed by the data. As we will show, the empirical analysis tends to confirm that a relationship between human development, transfer expenditures and electoral systems does exist.

This brief review of the economic literature related to the link between institutional arrangements and public finance rests on the difference between majoritarian and proportional electoral systems as well as on the intricate concept of degree of proportionality of a system. These notions have been extensively discussed in the political science literature (for example, Lijphart, 1999). Given the scope of this paper, it is important to stress that we deliberately chose an indicator that is related to the electoral system itself rather than to electoral results. Concepts such as *effective magnitude* as proposed by Taagepera and Shugart (1989), Ordeshook and Svetsova (1994), Neto and Cox (1997), for example, or *effective threshold* as proposed by Taagepera and Shugart (1989) (indeed Lijphart [1994] considers the two as being “two sides of the same coin”) are quite important and interesting. But as they are based on election results, these notions are not really suited for the analysis we want to carry out in this paper.<sup>6</sup>

We also decided not to base our analysis on a (too) simple binary classification of systems (such as coding the system as proportional if at least half the representatives are elected by a proportional rule) since this mixes up too many cases. Using *mean district magnitude* allows us to grasp the degree of proportionality of the electoral system independently of electoral results.<sup>7</sup> Cox (1997) and Taagepera (1998), for example, stress the difficulty of measuring district magnitude especially in multi-level electoral systems. In our study, we rely on the work of Keefer (2002), who defines the mean district magnitude as the weighted average of the number of representatives elected by each constituency size. Furthermore, we decided to use the logarithm of the mean district magnitude, in order to reduce differences among proportional systems, while maintaining the gap with respect to majoritarian ones.

Before presenting the results in detail, it is important to clearly define our methodology and the data used. The following section does this after presenting some stylized facts.

### Data and methodology

A simple descriptive analysis is the first necessary step to test for a relation between human development, social security spending and electoral systems. Table I, which presents the average Human Development Index and the average level of social security spending<sup>8</sup> per year and by system, can help to reveal whether proportional democracies are systematically associated with higher levels of human development<sup>9</sup> and redistributive expenditures.<sup>10</sup> Note that for this simple analysis we decided to code a system as proportional if at least one-half of the representatives are elected by a proportional rule, and to code the system as majoritarian if it is otherwise. We will refine this naive measure further on. Social security spending is given as a percentage of GDP, as suggested by Persson and Tabellini (1999).

From Table I, we see that for all the years considered, both the levels of social security expenditures and human development are higher in proportional systems than in majoritarian ones.<sup>11</sup>

Table I. Average human development and average welfare spending by type of system

System	Variable	1975	1980	1985	1990	1995
Proportional	Social security	7.46	8.60	9.51	8.43	10.51
	Human development	0.73	0.76	0.78	0.79	0.81
	Number of observations	33	31	31	29	27
Majoritarian	Social security	4.75	4.80	4.96	4.43	4.83
	Human development	0.66	0.73	0.71	0.75	0.75
	Number of observations	17	18	15	15	15

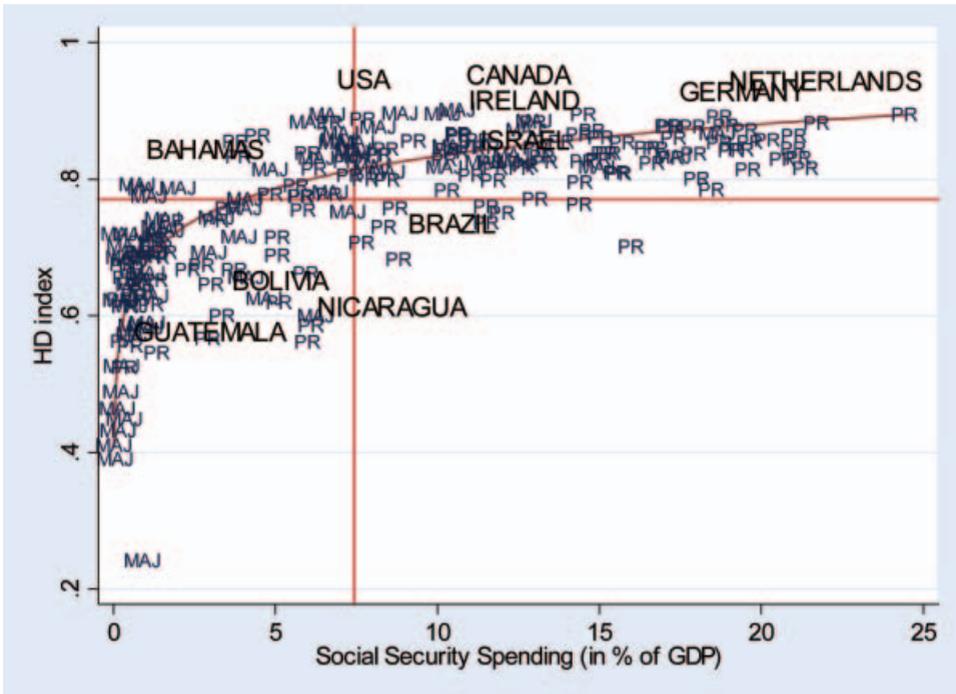


FIGURE 1. Human development and social security expenditures.

It is quite interesting to graph these features to gain a better idea of the relation between the variables. This is done in the scatter diagram of Figure 1, in which the human development indicator is on the vertical axis and social security spending (as a percentage of the GDP) is on the horizontal axis. The variables are presented for all the available years. As the type of electoral system is the main focus of our analysis, each observation is labeled with either *prop* (if the electoral system used for the election of the lower house of parliament is mainly proportional) or *maj* (if it is mainly majoritarian). Horizontal and vertical lines are drawn respectively through the average of the Human Development Index and that of the social security indicator. The names of some countries for which we will provide some additional explanations are indicated in the figure. Finally a logarithmic fitting curve is added to show the estimated relationship.

In Figure 1, we plotted 228 points, representing 56 countries, each for (on average) 4.07 years. This means that each country appears several times. What is striking is that countries with higher levels of both human development and social security (north-east area of the diagram) are mostly proportional. Countries with lower levels of both factors (south-west area) are mainly majoritarian. Countries that have proportional systems are mainly Latin-American (such as Bolivia, Nicaragua and Guatemala). These countries are associated with low levels of human

development and limited social spending, although their electoral systems are proportional. Nevertheless, if we compare them with countries using majoritarian systems with similar development levels, we see that the latter are associated with even lower levels of social security. If we look at highly developed countries, a similar feature appears. Some countries are notable outliers in this relation. First, Germany, which has a mixed, mainly majoritarian system, enjoys a very high level of social spending with respect to its expected value, given its degree of proportionality. Indeed, it is almost comparable with The Netherlands (although the district magnitude is very different). As for Israel, we notice the opposite: given the level of proportionality of its system, we might have expected it to have higher levels of social spending. Of course, other effects intervene in this relation that might explain its position. Countries such as Canada and the United States are associated with very high levels of human development, even if they have relatively limited social expenditures. Finally, there is the example of Ireland, which, although under a proportional system, has a lower level of human development than Canada, with a similar level of expenditures. From this simple analysis, we only gain a very vague idea of the relationship between the considered variables. As will be explained further on, to obtain a more precise view, country effects and socio-democratic variables have to be accounted for.

The relationship between social security spending and human development is clearly concave and increasing. More precisely, it appears that, for these data, a logarithmic fit is probably much more appropriate than a linear one. These findings are interesting, but they are of course not sufficient to be conclusive, and a much deeper analysis is required. A first step, therefore, is to take a more precise measure of the degree of proportionality of a system than a simple dummy variable. Second, we need to consider control variables to avoid the omitted variable bias. Third, we need to work with a system of equations to test for both predicted effects simultaneously. Fourth, we should consider other dependent variables related to human development to see whether our results are to stand. Finally, since the available data are not balanced between countries, we need to check whether the results are not affected by awarding the same weight to all the data.

We now turn to a detailed description of the data and of our general methodology. As stated previously, our data have a panel structure. Given that we want to see the effect of electoral systems on human development through redistributive fiscal spending, we propose to use a two-stage least-squares methodology, correcting the standard errors for group-wise heteroskedasticity. Since the electoral variable we are interested in hardly changes over time, a fixed-effect regression is not suitable here.<sup>12</sup> A random effect estimator would be of no use either, since the individuals we consider are countries and it is difficult to believe in strict independence between exogenous variables and the permanent component of the error term. A between estimator is not suited either since some

dummy variables change over time, and the period of observation differs a lot between countries.<sup>13</sup> On this point, the method underlying the between estimator consists of running a regression of the average (over time) of the dependent variable by country on the average (over time) of the explanatory variables. If data are not available for the same period for all of the countries, we might be comparing variables at different moments in time.

From all these rather technical comments made, it appears that the most appropriate method here is a pooled clustered regression, controlling for time and regional effects.

The cluster option is considered to control for the fact that observations are independent across countries, but not within countries. Given that the panel is unbalanced and we have no way of testing whether the unobserved data are randomly missing, it might be argued that we award more importance to some countries than to others. As a robustness test, we decided to compare our results with a weighted regression where all observations are given the same importance. We arrived at similar conclusions.

To test whether electoral systems affect human development through transfer expenditures, the specification is rather straightforward. We should first check whether electoral systems really affect transfer expenditures unequally, and then check whether we find that higher transfer expenditures are associated with higher levels of human development.

Formally this can be done by running a system of equations of the type:

$$\begin{cases} TR_{it} = \eta + \beta_{11}Z_{it} + \beta_{12}G_{it} + \sum_{j=1}^3 \phi_j O_{i,j} + \sum_{k=1}^4 \delta_{1k} I_{.tk} + \sum_{j=1}^3 \gamma_{1j} C_{i,j} + v_{it} \\ HD_{it} = \alpha + \beta_{21}TR_{it} + \beta_{22}W_{it} + \sum_{k=1}^4 \delta_{2k} I_{.tk} + \sum_{j=1}^3 \gamma_{2j} C_{i,j} + \varepsilon_{it} \end{cases} \quad (1)$$

where  $i$  indexes countries and  $t$  time.  $HD_{it}$  is the human development variable considered,  $TR_{it}$  is the transfer expenditures,  $Z_{it}$  is the variable identifying the degree of proportionality of the electoral system (almost time invariant),  $W_{it}$  is the matrix of the control variables for the explanation of transfer expenditures and  $G_{it}$  is the matrix containing the control variables for the explanation of human development;  $I_{tk}$  are the time dummies,<sup>14</sup>  $C_{i,j}$  are the regional dummies,<sup>15</sup>  $O_{i,j}$  are the colonial origin dummies.<sup>16</sup>  $\alpha$  and  $\eta$  are the constants and  $\beta_{11}$ ,  $\beta_{12}$ ,  $\beta_{21}$ ,  $\beta_{22}$ ,  $\gamma_{1j}$ ,  $\gamma_{2j}$ ,  $\delta_{1k}$ ,  $\delta_{2k}$ ,  $\phi_j$  are the coefficients to be estimated.  $\varepsilon_{it}$  and  $v_{it}$  are the error terms. All of the variables will be described in detail further on. The estimation technique is a two-stage least-squares method, controlling for group-wise heteroskedasticity.

Concerning the source of the data, human development indicators were taken from the United Nations Development Programme (UNDP) website,<sup>17</sup> social security expenditure and public finance data come from

the Global Finance Statistics of the International Monetary Fund (IMF) (2002),<sup>18</sup> the electoral system and other political variables were drawn from the Database of Political Institutions (2002),<sup>19</sup> the socio-economic variables were taken from the Socio-Economic Database of the IMF (2002),<sup>20</sup> and the International Database of the US Bureau of Census (2004),<sup>21</sup> and the macroeconomic variables were obtained from the IMF Macro Time Series Database (2002).<sup>22</sup>

In accordance with theoretical predictions, we expect the following results. First,  $\beta_{21}$  should be strictly positive given that, as suggested by Strauss and Thomas (1995), transfer expenditures are supposed to improve human development. Second,  $\beta_{11}$  should also be strictly positive given that, as suggested among others by Persson and Tabellini (1999), we expect proportional systems to have a stronger effect on transfer expenditures than majoritarian ones (and we expect the effect to increase with the degree of proportionality). Third,  $\beta_{11} \cdot \beta_{21}$  should be strictly positive; that is, we expect that the effect of proportional systems is positive on human development through its effect on redistributive spending.

It is obvious that an electoral system has a meaning only in democracies.<sup>23</sup> For this reason, a first step is to identify a way of discriminating between democratic and non-democratic regimes. For this, we rely on the famous POLITY IV democracy indicator (Jagers and Marshall, 2000) and consider only countries that have a level of democracy higher than zero.<sup>24</sup> Our dependent variable must be some human development indicator. We consider three such indicators that are generally accepted as adequate in the literature: the Human Development Index (calculated by the UNDP), the mortality rate and life expectancy. We describe these indicators in the following. Given that some of these human development indicators are only available every five years, for this analysis we will consider the period between 1975 and 1995 with five-year intervals. Removing all missing observations, we arrive at a sample of 261 observations in 59 democratic countries. Note that, in order to test for the robustness of our results, we check whether our findings remain consistent when we constrain our analysis only to highly democratic countries, which we choose as those corresponding to a level of democracy above 5 in the POLITY IV index.

As stated previously, three indicators are considered to measure human development ( $HD_{it}$ ). First, the *Human Development Index*, an aggregate index that measures the average level of a country taking into consideration three dimensions: life expectancy at birth, the level of education (measured by the adult literacy rates), and a decent standard of living measured by GDP per capita (purchasing per parity US dollars) In several studies, this human development indicator has been criticized for not having a constant definition over time (note that for each year, the definition is the same for all countries). To correct for this in the empirical part, we remove the time effect and thus control for the difference in level due to these heterogeneous definitions.

The second indicator is the *mortality rate*, often considered a good proxy for human development. This variable indicates the number of deceased per 1000 inhabitants in the considered population; that is, the gross mortality rate = number of deceased/total population  $\times$  1000. It is generally considered that this rate is high if it is above 30%, moderate if it is between 15% and 30%, and low if it is below 15%. This variable is available from the International Database of the US Bureau of Census.

The third indicator used is *life expectancy*, which is the average number of lived years for the entire population (life expectancy = aggregate number of lived years/population). This is also generally accepted as a good proxy for human development since it is highly correlated to the determinants of human development.

As far as the independent variables are concerned, the first, which we call *transfers* ( $TR_{it}$ ), is the logarithm of the social security and welfare spending, as a percentage of the GDP, provided by the Government Finance Statistics of the IMF. The *degree of proportionality of the electoral system* ( $Z_{it}$ ), is calculated as the logarithm of the mean district magnitude ( $\ln m_{dmh}$ ) as can be found in the Database of Political Institutions (DPI) elaborated by the World Bank, since, from the work of Taagepera and Shugart (1989) among others, almost all electoral specialists agree that the principal determinant to translate votes into seats in parliamentary elections is the district magnitude.<sup>25</sup>

The control variables considered here are those commonly accepted as influencing transfer expenditures and/or human development; that is, the degree of openness (trade) as proposed by Verardi (2005) — calculated as the sum of exports and imports divided by the GDP — the percentage of people older than 65 as proposed by Deaton (1997), the Output gap ( $y_{gap}$ ) as proposed by Persson and Tabellini (2003) — measured as the logarithm of the deviation of the GDP with respect to the long-run path — the logarithm of the population to take into account the size of the country ( $\ln pop$ ), the primary school enrollment rate as proposed by Barro and Lee (1993) and, finally, the GDP per capita. In addition, dummy variables identifying each year, each world region and the colonial origin are considered to control, respectively, for an eventual shock that may have affected all of the countries during a given year (or changes in the definition of a variable), for differences in the level of transfer expenditures and human development in the different regions of the world, and/or an eventual colonial effect as insinuated by both economists (for example, Aghion *et al.*, 2004) and political scientists (for example, Weiner, 1987; Blais and Dion, 1990; Stepan and Skach, 1993).

## Main results

As stated in the methodology section, we use a two-stage (weighted) pooled regression of the logarithm of the mean district magnitude on social security spending and of the latter on the three measures of human development described earlier. For the sake of clarity, we present all of the

results for the second stage of the regression (top of Table II) while for the first stage (bottom of Table II) we only present the results associated with the variable we are interested in; that is, the logarithm of the mean district magnitude (Log M. D. Magnitude). In neither of the stages do we present the time specific effects that were estimated in the regressions. Table II contains six columns: the three first columns contain the results relative to the three considered indicators of human development for the broadest sample,<sup>26</sup> and the last three contain those relative to the narrowest sample.<sup>27</sup>

Analyzing the effect of the mean district magnitude on transfer expenditures (in the first stage), we see that in all cases doubling the degree of proportionality, in the sense explained earlier, implies an increase of about 30% of the spending in social security and welfare. This result confirms that there is indeed a close link between electoral systems and the breakdown of government expenditures. We also see that social security and welfare spending, as expected, increase human development. The effect is significantly different from zero and positive in all of the regressions.

This demonstrates that electoral systems have an indirect impact on human development through their effect on the breakdown of government spending. To have an idea of the size of effect, we multiply the elasticity of social security spending with respect to the degree of proportionality (i.e. the coefficient  $\beta_{11}$ ) by the elasticity of human development with respect to social security spending (coefficient  $\beta_{21}$ ). The result for all the specifications is presented in Table II in the row labeled  $\beta_{11} \cdot \beta_{21}$ . The results are consistent with our predictions. If the district size doubles, the Human Development Index increases by 1.3%, the mortality rate decreases by almost 11% and life expectancy increases by almost 1% (and this for both sufficiently and highly democratic countries).

Let us illustrate this by a simple theoretical example: consider a single member district (in other words, a pure majoritarian system). Doubling its size (i.e. going towards a two-member district) would increase human development by 1.3%, which does not seem much. But consider, instead, a move to a 40-member district (as is the case in Brazil, for example). Here the increase in human development would be in the neighborhood of 50%, which is of course substantial. This also means that changing a system just a little bit might not be very effective in increasing human development, while moving from a purely majoritarian to a purely proportional system might be much more efficient.

## **Conclusion**

Human development is a concept that is gaining interest in the academic economic scientific literature. From the seminal work of Sen (1990), substantial interest has been clearly directed toward the topic, while it is becoming more and more accepted that human development is without

Table II. Mean District Magnitude and Human Development

	Democracy level>0			Democracy level>5		
	Log human development	Log mortality	Log life expectancy	Log human development	Log mortality	Log life expectancy
Log social security	0.042*** (3.49)	-0.374*** (4.33)	0.025*** (2.74)	0.043*** (3.72)	-0.380*** (4.26)	0.027*** (3.08)
Log population	-0.002 (0.26)	0.107*** (3.28)	0.001 (0.13)	-0.011 (1.33)	0.113** (2.66)	-0.004 (0.72)
GDP per capita	0.000*** (4.90)	-0.000*** (3.92)	0.000** (2.09)	0.000*** (4.78)	-0.000*** (3.81)	0.000** (2.02)
Latin America	0.002 (0.05)	0.408** (2.24)	-0.016 (0.79)	-0.011 (0.42)	0.370* (1.94)	-0.019 (0.87)
Asia	-0.004 (0.07)	-0.325 (1.20)	-0.036 (0.96)	0.050 (0.95)	-0.467 (1.39)	0.008 (0.19)
Africa	-0.164** (2.40)	0.496** (2.40)	-0.128** (2.24)	-0.165*** (2.87)	0.446** (2.14)	-0.119** (2.41)
Openness	-0.000 (0.79)	0.002 (1.56)	-0.000 (0.11)	-0.001 (1.42)	0.002 (1.29)	-0.000 (0.64)
Output gap	0.011** (2.53)	-0.008 (0.64)	0.000 (0.22)	0.010** (2.52)	-0.008 (0.56)	-0.000 (0.20)
School enrollment	0.006*** (4.67)	-0.003 (0.80)	0.002** (2.25)	0.007*** (5.87)	-0.005 (0.99)	0.003*** (2.81)
Constant	-0.969*** (5.44)	2.626*** (3.31)	3.920*** (27.01)	-0.910*** (4.88)	2.747*** (2.93)	3.935*** (24.31)
Log social security						
Log M. D. magnitude	0.304*** (4.56)	0.291*** (4.62)	0.339*** (5.01)	0.280*** (3.68)	0.278*** (3.95)	0.340*** (4.08)
$\beta_{11} \cdot \beta_{21}$	0.013	-0.109	0.008	0.012	-0.106	0.009
Observations	143	136	117	131	124	106
$R^2$	0.89	0.84	0.77	0.90	0.84	0.79

Robust  $t$  statistics presented in parentheses. \*Significant at 10%, \*\*significant at 5%, \*\*\*significant at 1%.

any doubt a key concept to understanding whether a society is reaching its economic goals or not.

Several causes for human underdevelopment have been considered in the literature. In this paper we try to understand whether political institutions, in particular electoral systems, can be considered as also playing a role. Our findings are promising: using simple econometric techniques and several definitions of human development, we find strong evidence showing that electoral systems affect human development through their effect on social security and welfare spending. We firmly believe that scholars who are interested in institutional engineering should take into account human development as one of the key elements to be considered when envisaging any institutional reorganization. Even if further research is obviously necessary to be able to make any policy recommendations, it clearly appears that the way in which votes are translated into parliamentary seats is crucial.

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### **Notes**

- 1 Note that the size of a district is defined here as the average number of politicians elected by electoral district. This will be explained more in detail later on.
- 2 Or even less in the case of pure 'winner takes all' systems where there are more than two viable parties.
- 3 In a way, majoritarian systems can be considered as wrongly labeled: proportional representation actually enhances the likelihood of governments with majority support.
- 4 In the broad sense (i.e. also linked to health and education).
- 5 Note that, following Milesi-Ferretti *et al.* (2002), what we call welfare expenditures in this analysis are only monetary transfers to households and do not include education and health. As a robustness test, we checked whether our results remain valid if we consider all these expenditures together. The generality of the results still holds.
- 6 Other notions such as the effective number of parties or the Herfindhal fractionalization index are not mentioned here, but also depend on election results.
- 7 Even if the ruling parties might change the system to influence their probability of re-election.
- 8 *Source*: Government Finance Statistics, IMF, 2002.
- 9 *Source*: UNDP website ([http://hdr.undp.org/statistics/data/indic/indic\\_10\\_1\\_1.html](http://hdr.undp.org/statistics/data/indic/indic_10_1_1.html)).
- 10 Following Milesi-Ferretti *et al.* (2002), we restrict welfare spending to social security since it is the only pure redistributive expenditure. Education and health, for example, are composed of two parts: one is redistributive, the other generates no externalities. Unfortunately, it is impossible to separate these two parts in the data.
- 11 When we perform a test of comparison of means, we never reject the hypothesis that both variables are higher in proportional systems with respect to majoritarian ones (at the 5% confidence level).

- 12 Among others, Lijphart (1994) identified a few changes in the electoral systems of some countries. The number and the extent of these changes imply that there is not enough variation in our data set to allow a sufficiently precise fixed-effect estimation.
- 13 In particular, dummy variables identifying slight modifications in the definition of the indicator.
- 14 The reference year is 1975.
- 15 Latin America, Africa and Asia.
- 16 British, Spanish and others.
- 17 [http://hdr.undp.org/statistics/data/indic/indic\\_10\\_1\\_1.html](http://hdr.undp.org/statistics/data/indic/indic_10_1_1.html)
- 18 The dataset is available at: <http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/0,,contentMDK:20701055~pagePK:64214825~piPK:64214943~theSitePK:469382,00.html#2>
- 19 The dataset is available at: <http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/0,,contentMDK:20649465~pagePK:64214825~piPK:64214943~theSitePK:469382,00.html>
- 20 The dataset is available at: <http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/0,,contentMDK:20701055~pagePK:64214825~piPK:64214943~theSitePK:469382,00.html#2>
- 21 The dataset is available at: <http://www.census.gov/ipc/www/idbnew.html>
- 22 The dataset is available at: <http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/0,,contentMDK:20701055~pagePK:64214825~piPK:64214943~theSitePK:469382,00.html#2>
- 23 Although, as correctly pointed out by a referee, it may also matter in systems with restricted suffrages (e.g. most European parliamentary systems in the nineteenth century).
- 24 The indicator goes from -10 to 10, where 10 represents a totally democratic regime and -10 represents a dictatorship.
- 25 That is, the number of members to be elected in each electoral district.
- 26 That is, countries with a democracy level above 0.
- 27 That is, countries with a democracy level above 5.

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