Development, Democracy and Political Regime Durability in EU 27

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Abstract:

The paper analyzes empirically, in E.U. 27's case, the relationship between economic development, intensity of democratization and political regime durability, using a binary choice panel model. The main conclusion of the paper shows that:

(1) In European strong democratic republic, the best economic development can be obtained only if the political regime durability is very high.

(2) In European strong autocratic monarchy, the best economic development can be obtained even if the political regime durability is very low.

Key Words: Development, Democracy, Political stability, Panel, Logit

I. INTRODUCTION

When viewed over a long period of time, strong connections exist between economic development, democracy and political regime durability. In this context, our approach tries to find the intensity of this relationship, especially in regards to E.U.27 (European Union 27), using a binary choice panel model.

Traditionally, Nafziger (2006) considers economic development to be economic growth accompanied by changes in output distribution and economic structure. In a modern vision, Todaro and Smith (2009) see economic development in terms of the reduction or elimination of poverty, inequality and unemployment within the context of a growing economy. Adelman and Yeldan (2000) illustrates that the concept of development must include: (1) self-sustaining growth; (2) structural changes in patterns of production; (3) technological upgrading; (4) social, political and institutional modernization; and (5) augmentation of social human conditions.

The level of economic development varies from one period to another and from one country to another, being subordinate to a series of factors such as human capital, physical capital, population and technological progress. Bildirici and Sunal (2006) show that with these mentioned factors, several other determinants appear, such as: public debt, role of the state, tax structure, political regime and instability, defense expenditures, geographical position, foreign capital, specialization in foreign trade and technological adaptation.

In the case of political factors, two of them are particularly noteworthy: the intensity of democratization and the political regime durability. In a classical approach, Welzel (2007) defines democracy by constitutional constraints on state power and by popular controls over state power. From another perspective, for Vanhanen (2003), democracy means free popular elections to fill positions of power. The same author notes that the political regime durability is the number of years since the most recent regime changed or the end of a transition period defined by the lack of stable political institutions.

Except Section 1, the paper is organized as follows. Section 2 treats the review of literature, followed by data description and its sources. Section 3 presents methodology and results of the analyses. Section 4 concludes.

II. LITERATURE

The field literature offers contradictory results about the sign of considered variables, which reflect the connection between economic development, democracy and political stability.

Sirowy and Inkeles (1990) believe that democracy facilitates economic development and not vice versa. More precisely, they said “democracy first and development later”. In the same way, Przeworski, Alvarez, Cheibub and Limongi (2000) consider that, generally, political instability decreases state’s economic development (in particular, in autocracies).

Siegle, Weinstein and Halperin (2004) argue that democracy brings political checks and balances, responsiveness to citizen priorities, openness, and self-correcting mechanisms - all of them contributing to steady growth and superior living conditions. Oliveira-Brochado and Martins (2005) reveal a positive but not perfect relationship between democracy and economic and human development, thus presenting new insights for the understanding of the heterogeneity of behaviors relatively to political indicators.

Also, Campos (1994) and Menocal (2007) claim that democracy determines economic development (measured with per capita income level) and Bhagwati (2002) thinks that democracy is better for development only when it is accompanied by an expansion of markets and competition.

Bardhan (1999) is reticent regarding the investigation methodology and the quality of the existing data sets. He recommends the traditional analysis, using measures such as per capita income or the human development index, but combats the "cross-country regressions."

All the theoretical elements presented allow us to formulate two theoretical working assumptions. The hypotheses are:

H_1: The level of economic development is growing as the intensity of democratization is increasing.

H_2: The level of economic development is growing as the political regime durability is increasing.

The meanings of the hypothesis' work relations are presented in Table 1, in Appendix.

III. DATA, METHODOLOGY AND RESULTS

Starting with the theoretical argues shown, the paper analyzes empirically, in E.U.27's case, the relationship between economic development, intensity of democratization and political regime durability.

a. The economic development (GDP per capita - GDPP) is taken from International Monetary Fund (2009) and suggests the level of economic development as GDP per capita (current international dollar). This measure is used as a component of the human development index (HDI) because the data set of HDI is too short and fractionated for our binary choice panel objective analysis.

b. Intensity of democratization (Index of Democratization - ID) is taken from Marshall et al. (2009) and represents the rank of democracy's level: from +10 "strongly democratic" to -10 "strongly autocratic".

c. Political regime durability (Regime Durability Score - RD) is taken from Marshall et al. (2009) and represents the number of years since the most recent regime change or the end of

transition period defined by the lack of stable political institutions: from 0 "very unstable" to +∞ "very stable".

The data set is covering the period 1990-2009, in E.U.27's case, in panel form, with 25 cross-sections (ID and RD, for Luxembourg and Malta, is unavailable) and 475 observations (see the variables and its sources in Table 2, in Appendix).

Generally, the field literature shows that the analysis' instruments regarding considered relationship refer to the descriptive methods, simple and multiple OLS regressions, pooled OLS models, dynamic probit models or, in a modern new trend, panel models, panel VAR models or fuzzy alternative. So, we have selected for our analysis a binary choice panel model type. For the first time, this type of model has been used in economy in the 1950s. The pioneer of binary choice model in economic field treats the analysis of ownership of cars as a function of household income (Farrell, in 1954).

Why we have chosen binary choice model type and not OLS one? For two reasons: (a) Pohlmann and Leitner (2003) show that logistic regression results will be comparable to those of OLS in many respects, but give more accurate predictions of probabilities on the dependent outcome; and (b) Vogelvang (2005) notes that, generally, all the logit estimates are clearly larger than the OLS estimate.

Based on variables and theoretical assumptions made above, in our binary choice panel approach, the dependent variable GDPP becomes "The probability of GDP per capita to increase with 5%" - P:

$$P = \begin{cases} 1, \text{ if } \dfrac{G_n - G_{n-1}}{G_{n-1}} x100 > 5\% \\ 0, \text{ if } \dfrac{G_n - G_{n-1}}{G_{n-1}} x100 \le 5\% \end{cases} \quad (1)$$

where n is a period.

Finally, we entered a control dummy variable - T, which reflects the type of the state (republic or monarchy). The reason is given by Bjørnskov and Kurrild-Klitgaard (2008): the republics ought to grow faster than monarchies and experience lower transitional costs following reforms. We note that the T does not add the problem of collinearity among regressors because T *is not* a dimension of democracy or autocracy. If the state is a republic, the dummy is 1, and if the state is a monarchy, dummy is 0.

The signs of P (dependent variable) and its determinant factors (ID, RD and T) are shown in Table 3, in Appendix. Among four proposed binary choice panel models, with probit, logit and extreme value alternatives, based on McFadden R-squared and Akaike info, we have selected a logit model (2) (Table 4, in Appendix). All the models have very low levels of McFadden R-

squared. As Brooks (2008) notes, there is not a problem, because this is often the case for limited dependent variable models, such is binary choice types.

According to Dougherty (2007), "in logit estimation one hypothesizes that the probability P of the occurrence of the event is determined by the function":

$$P_i = F(Z_i) = \frac{1}{1 + e^{-Z_i}} \quad (2)$$

where Z is a linear function of the explanatory variables.

The marginal effect of Z on the probability, which will be denoted f(Z), is given by the derivative of this function with respect to Z:

$$f(Z) = \frac{dp}{dZ} = \frac{e^{-Z}}{(1 + e^{-Z})^2} \quad (3)$$

As with logit analysis, the marginal effect of any variable is not constant. It depends on the value of f(Z), which in turn depends on the values of each of the explanatory variables. To obtain a summary statistic for the marginal effect, the usual procedure is parallel to that used in logit analysis, based on the mean values of the explanatory variables.

In the considered case, Z is given by:

$$Z = \alpha + \beta_1 xID + \beta_2 xRD + \beta_3 xT + \varepsilon \quad (4)$$

where α - the intercept term, β1, 2, 3 - the slops and ε - the disturbance term. Table 5, in Appendix, shows that from 475 included P observations, 53.7% are 0 and 46.3% are 1.

The econometric tests of the "Logit Panel Model", presented in Table 6, in Appendix, show that the coefficients are significant at standard levels of confidence (at 10%), a conclusion reinforced by the low values of the probabilities. The value of the LR-test is 15.61 (0.001), so the null hypothesis of zero slopes can be rejected.

To obtain the robust standard errors, we used Berndt-Hall-Hall-Hausman optimization algorithm. Based on the model, the prediction values are illustrated in Table 7, in Appendix. The estimated model correctly predicts 60.42% of the observations (68.63% of the Dep=0 and 50.91% of the Dep=1 observations). Overall, the estimated equation is 6.74% points better at predicting responses than the constant probability model.

The correlogram of standardized residuals and the correlogram of standardized residuals squared show that there are not autocorrelations or partial correlations of the residuals for all considerate lags, except the lag 1 (Table 8 and 9, in Appendix). More, the Andrews and Hosmer-Lemeshow Goodness-of-Fit Tests show that the caution in order to interpret the results is minimal (Table 10, in Appendix).

In conclusion, the model may be considered stabile and representative to describe, in E.U.27's case, the connection between P and ID, RD & T. The method for identifying the effects of ID, RD & T on P consists in calculating the marginal effects with the mean values of the explanatory variables. The Table 11, in Appendix, shows the marginal effects, calculated by multiplying f(Z) with the estimate coefficients of the logit panel regression. Starting from the marginal effects measured on the "logit panel model", we can identify the following results:

- an one-point increase in the ID, increases by 5.84% the P;

- an one-point increase in the RD, decreases by 0.19% the P;

- an one-point increase in the T, increases by 11.78% the P.

or

- an one-point increase in the ID, decreases by 94.16% the P;

- an one-point increase in the RD, increases by 99.81% the P;

- an one-point increase in the T, decreases by 88.22% the P.

We can observe that the results infirm considered hypothesis. More, the results combat partially the conclusions of all mentioned authors. A novelty of the paper is the existence of a significant impact of state's type (republic or monarchy) on the economic development, in E.U.27.

IV. CONCLUSION

For the analyzed period, in U.E.27, a high level of democratization, with a low range of political regime durability, on republican base, determines a low level of the P. In this case, it's plausible that the economic development's level to be very low rather then very high (upper 5% annually). So, a European Union republican state, with high level of democratization, but unstable from political point of view, cannot ensure a circumstance for an appreciable level of economic development. The results show that republican democracy can be destructive for development, but this is not a rule.

Otherwise, talking about a European Union monarchy, a high level of autocracy, with a high range of political regime durability, determines a high level of the P. In this statement, the economic development's level it's very high rather then very low (not upper 5% annually). The monarchical autocracy appears to be a good determinant for the economic development.

Which is the reason? The main difference between republic and monarchy consists in the existence of presidential elections in republic's case. In this type of state, the presidential election can determine some shocks on economic system and development, as in the period of the parliamentary election. So, some significantly implications of "republican elections' attributes" on economic development can be identified.

Based on this remarks, we can take two main conclusions:

(1) In European strong democratic republic, the best economic development can be obtained only if the political regime durability is very high.

(2) In European strong autocratic monarchy, the best economic development can be obtained even if the political regime durability is very low.

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APPENDIX

Table 1: The "signs" of the hypothesis' work variables

Variable and "tendency sign"	Variable and "tendency sign"
Economic development + or –	The intensity of democratization + or –
Economic development + or –	The political regime durability + or –

Table 2: The variables description and its sources

Variable	Measure and description	Source
Economic development (GDPP)	GDP per capita, suggests the level of economic development as GDP per capita (current international dollar).	International Monetary Fund, World Economic Outlook Database (2009)
Intensity of Democratization (ID)	Index of Democratization illustrates the rank of democracy's level (democracy - high level, autocracy - low level)	Marshall & Jaggers (2009)
Political Regime Durability (RD)	Regime Durability Score represents the number of years since the most recent regime change or the end of transition period defined by the lack of stable political institutions.	Marshall & Jaggers (2009)
Type of the state (T)	Dummy variables, reflects the form of government (republic - 1 or monarchy - 0).	Dummy methodology

Table 3: The expected signs of P - ID, RD and T according to working hypothesis

P	The determinant factors of P	The trend of determinant factors of P
+	ID	+
+	RD	+
+	T	+

Table 4: Selection of binary choice panel model type

Dependent variable: P												
Model	(1)			(2)			(3)			(4)		
Coefficient	Probit	Logit	Extreme Value	Probit	Logit	Extreme Value	Probit	Logit	Extreme Value	Probit	Logit	Extreme Value
ID	0.145155 (0.026)*	0.235246 (0.0276)	0.153082 (0.0233)	0.141801 (0.0293)	0.229681 (0.0308)	0.149786 (0.0267)	0.104032 (0.0906)	0.167133 (0.0941)	0.113065 (0.0792)			
RD	-0.004902 (0.0548)	-0.007982 (0.0548)	-0.005009 (0.0611)	-0.007295 (0.0007)	-0.011812 (0.0008)	-0.007647 (0.0005)				-0.003024 (0.2081)	-0.004882 (0.2091)	-0.003195 (0.2074)
T	0.295802 (0.0808)	0.474224 (0.0823)	0.32453 (0.0739)				0.472142 (0.0009)	0.757724 (0.0011)	0.512214 (0.0006)	0.285537 (0.092)	0.458802 (0.0937)	0.30798 (0.0843)
Intercept	-1.537912 (0.0142)	-2.487274 (0.0154)	-1.268072 (0.0501)	-1.201085 (0.0438)	-1.945447 (0.0459)	-0.903801 (0.1406)	-1.442366 (0.0208)	-2.316959 (0.0222)	-1.197084 (0.0669)	-0.212517 (0.2773)	-0.341057 (0.2801)	0.136741 (0.508)
McFadden R-squared	0.023752	0.023806	0.023314	0.019082	0.01916	0.018529	0.018098	0.018089	0.018086	0.016125	0.016127	0.016079
S.D. dependent var	0.499167	0.499167	0.499167	0.499167	0.499167	0.499167	0.499167	0.499167	0.499167	0.499167	0.499167	0.499167
Akaike info criterion	1.364904	1.364829	1.365508	1.367142	1.367034	1.367906	1.368501	1.368513	1.368517	1.371226	1.371222	1.371289
Schwarz criterion	1.399964	1.399889	1.400568	1.393437	1.393329	1.394201	1.394796	1.394808	1.394812	1.397521	1.397517	1.397583
Hannan-Quinn criter.	1.378692	1.378616	1.379295	1.377482	1.377374	1.378246	1.378842	1.378854	1.378858	1.381566	1.381562	1.381629
LR statistic	15.57897	15.61471	15.29211	12.51614	12.56739	12.15314	11.87044	11.8647	11.86276	10.57623	10.57808	10.54632
Prob (LR statistic)	0.001383	0.00136	0.001583	0.001915	0.001866	0.002296	0.002645	0.002652	0.002655	0.005051	0.005047	0.005127

* () The probability at 10% level of significance.

Table 5: The P annual frequencies in 1990-2009 periods

Dependent Variable: P				
Value	Count	Percent	Cumulative Count	Percent
0	255	53	255	53.7
1	220	46	475	100

Table 6: The econometric tests of "Logit Panel Model P, ID, RD and T"

Dependent Variable: P				
	Coefficient	Std. Error	z-Statistic	Prob.
ID	0.235246	0.102475	2.295635	0.0217
RD	-0.007982	0.004096	-1.948963	0.0513
T	0.474224	0.273571	1.733460	0.0830
C (Intercept)	-2.487275	0.988317	-2.516678	0.0118
S.D. dependent var	0.499167	Mean dependent var		0.463158
Akaike info criterion	1.364829	S.E. of regression		0.492552
Schwarz criterion	1.399889	Sum squared resid		114.2683
Hannan-Quinn criter.	1.378616	Log likelihood		-320.1469
LR statistic	15.61471	Restr. log likelihood		-327.9543
Prob(LR statistic)	0.001360	Avg. log likelihood		-0.673993
Obs with Dep=0	255	Total obs		475
Obs with Dep=1	220			

Table 7: The prediction values of P base on the model

Dependent Variable: P						
	Estimated Equation			Constant Probability		
	Dep=0	Dep=1	Total	Dep=0	Dep=1	Total
P(Dep=1)<=C	175	108	283	255	220	475
P(Dep=1)>C	80	112	192	0	0	0
Total	255	220	475	255	220	475
Correct	175	112	287	255	0	255
% Correct	68.63	50.91	60.42	100.00	0.00	53.68
% Incorrect	31.37	49.09	39.58	0.00	100.00	46.32
Total Gain*	-31.37	50.91	6.74			
Percent Gain**	NA	50.91	14.55			

*Change in "% Correct" from default (constant probability) specification
**Percent of incorrect (default) prediction corrected by equation

Table 8: The correlogram of standardized residuals

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
.|*** |	.|*** |	1	0.393	0.393	73.729	0.000
.|* |	.|. |	2	0.187	0.039	90.485	0.000
.|. |	.|. |	3	0.069	-0.020	92.781	0.000
.|* |	.|. |	4	0.078	0.061	95.744	0.000
.|* |	.|. |	5	0.084	0.041	99.111	0.000
.|* |	.|* |	6	0.126	0.083	106.79	0.000
.|. |	.|. |	7	0.059	-0.031	108.47	0.000
.|. |	.|. |	8	-0.021	-0.066	108.68	0.000
.|. |	.|. |	9	0.024	0.060	108.96	0.000
.|. |	.|. |	10	0.067	0.050	111.17	0.000

Table 9: The correlogram of standardized residuals squared

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
.|** |	.|** |	1	0.222	0.222	23.650	0.000
.|. |	*|. |	2	-0.035	-0.089	24.229	0.000
*|. |	*|. |	3	-0.158	-0.138	36.206	0.000
.|. |	.|. |	4	-0.027	0.041	36.549	0.000
.|. |	.|. |	5	0.030	0.015	36.978	0.000
.|* |	.|* |	6	0.199	0.179	56.049	0.000
.|. |	*|. |	7	-0.019	-0.112	56.229	0.000
*|. |	*|. |	8	-0.143	-0.108	66.191	0.000
.|. |	.|. |	9	-0.054	0.062	67.583	0.000
.|* |	.|* |	10	0.095	0.080	72.007	0.000

Table 10: Andrews and Hosmer-Lemeshow Goodness-of-Fit Tests

	Quantile of Risk		Dep=0		Dep=1		Total	H-L
	Low	High	Actual	Expect	Actual	Expect	Obs	Value
1	0.2378	0.3696	63	64.6429	32	30.3571	95	0.13066
2	0.3715	0.4592	58	54.4700	37	40.5300	95	0.53620
3	0.4593	0.5001	55	49.8254	40	45.1746	95	1.13016
4	0.5021	0.5508	47	44.8684	48	50.1316	95	0.19191
5	0.5508	0.5840	32	41.1933	63	53.8067	95	3.62250
		Total	255	255.000	220	220.000	475	5.61142
H-L Statistic			5.6114		Prob. Chi-Sq(3)		0.1321	
Andrews Statistic			11.4536		Prob. Chi-Sq(5)		0.0431	

Table 11: The marginal effects of "Logit Panel Model P, ID, RD and T"

Variable	Mean	b	Mean ×b	f(Z)	bxf(Z)	bxf(Z) in (%)
ID	9.498947	0.235246	2.234589	0.248485	0.058455	5.84550616
RD	33.04211	-0.007982	-0.26374	0.248485	-0.00198	-0.198340589
G	0.760000	0.474224	0.36041	0.248485	0.117837	11.78374686
C (Intercept)	1.000000	-2.487275	-2.48727			
Total			-0.15602			