

## MORE WOMEN, LESS CORRUPTION, BUT HOW MANY WOMEN ARE NEEDED?

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**Abstract:** The gender-based evaluation of corruption tends to conclude the negative relationship between women politicians and the level of corruption. However, the research admits the opposite nature of this relationship, too. In this paper, the expectation of a negative linear relationship between women in politics and corruption is replaced by the non-linear assumption based on different initial economic and political conditions among EU members. The research covers the sample of 27 EU countries in 2001-2021 with further division of the sample into sub-samples of new and old EU members. The results show that the share of women in politics should reach a certain level to achieve their potential impacts on the level of corruption. This result is emulated in the sample of new EU member states, too.

**Keywords:** corruption, gender equality, women's political representation, post-communistic countries

### 1 Introduction

The examination of corruption in terms of gender attitudes towards it expresses the countries' progress (Agerberg, 2014). Sundström and Wängnerud (2016) consider the share of women in politics as an indicator of modernization. Therefore, extensive research has been made in this field in the last decades. Many authors (e.g. Dollar, Fisman, and Gatti, 2001; Brollo and Troiano, 2016; Barnes, Beaulieu, and Saxton, 2018; Merkle, 2021; etc.) mention the negative relationship between women in government and the perception of corruption. Besides, many studies raise the question of whether women differ in their attitudes toward corruption and bribery when compared to men, and if they do, what is the reason (Esarey and Schwindt-Bayer, 2018; Schwindt-Bayer et al., 2018). Waylen and Southern (2021) point to the importance of the overall development of the country, when discussing the role of women in politics in the perception of corruption. Erlich and Beauvais (2023) mention the specific situation in post-communistic countries, that suffered from high levels of corruption, even the former legislation introduced gender quotas in politics.

In this paper, we focus on the examination of the nature of the relationship between women in politics and the level of corruption in the EU. We consider the heterogeneity of the EU members when evaluating their initial economic and political conditions. We regard the development of post-communistic countries performing the progress in public sector modernization. When estimating the relationship in the question, we take into account hereinbefore mentioned approaches, which leads us to shift from the expectation of the linear dependence to a non-linear one. The research is conducted on the sample of 27 EU countries in the period 2001-2021 with further division of the sample into sub-samples consisting of new and old EU members.

The paper is organized as follows. After the introduction, the literature review provides us with basic knowledge in the field of gender-based evaluation of corruption. The section on data and methods describes variables, resources, and employed research methods. Results and discussion present the main findings. The paper ends with a conclusion.

### 2 Literature Review

Corruption was supposed to be gender-neutral (Merkle, 2021; Cvetanoska, 2022), but in recent decades, the scientific literature discusses the different attitudes of men and women towards corruption (Jha and Sarangi, 2018; Bauhr and Charron, 2021; Merkle, 2021). Many authors (e.g. Agerberg, 2014; Jha and Sarangi, 2018; Merkle, 2021; and others) point to the importance

of the seminal works of Dollar, Fisman, and Gatti (2001) and Swamy et al. (2001), which challenged to capture the relationship between women's representation in politics and the level of corruption. Since then a myriad of research on the nexus of gender and corruption has been published analyzing the situation in many countries worldwide. However, the research on gender-based evaluation of corruption focuses both on developed and developing countries. Jha and Sarangi (2018) ran an analysis on a sample of 17 European countries finding a negative relationship between women politicians and corruption level. Waylen and Southern (2021) focus on the UK, Bauhr and Charron (2021) on the local level in France. Brollo and Troiano (2016) examine the relationship under scrutiny in Brazil. Batista Pereira (2021) takes into account Brazil and Mexico, Schwindt-Bayer et al. (2018) compare the USA and Brazil due to different electorate accountability. Asomah et al. (2023) investigate the gender-based evaluation of corruption in Ghana, Afridi, Iversen, and Sharan (2017) in India. Erlich and Beauvais (2023) focus on Ukraine.

According to the literature on gender-based corruption, the negative relationship between women's representation in politics and the level of corruption could be explained by higher honesty of women when compared to men, higher risk aversion of women when compared to men, harder punishment of women for corruption by voters and lower engagement of women in informal social networks that encourage the corruption (Esarey and Schwindt-Bayer, 2018; Barnes and Beaulieu, 2019; Merkle, 2021; Bauhr and Charron, 2021; Batista Pereira, 2021; Guerra and Zhuravleva, 2022; Asomah et al., 2023). McGee and Benk (2023) give a summary of research on gender-based attitudes towards corruption. Barnes and Beaulieu (2019) explain why are women perceived as morally superior to men.

Guerra and Zhuravleva (2022) investigate if female politicians work as corruption cleaners in line with discussion provided by e.g. Esarey and Schwindt-Bayer (2018), Schwindt-Bayer et al. (2018), Stensöta and Wängnerud (2018), Bauhr and Charron (2021), Waylen and Southern (2021), Armstrong et al. (2022). Esarey and Schwindt-Bayer (2018), Schwindt-Bayer et al. (2018), and Waylen and Southern (2021) pose certain doubts about the connection between the higher shares of women in politics and lower levels of corruption. Schwindt-Bayer et al. (2018) find no evidence for women politicians being less corrupt and no evidence, that the electorate punishes women politicians engaged in corruption more harshly. Esarey and Schwindt-Bayer (2018) mention, that the inverse relationship between women's representation in politics and levels of corruption is determined by the overall development of the country meaning its electorate's accountability including factors such as press freedom or parliamentary systems. Waylen and Southern (2021) find out, that whether women are less corrupt than men, depends on the level of accountability, too. Barnes, Beaulieu, and Saxton (2018) investigate which stereotype (risk aversion of women, greater perceived honesty, or outsider status) could explain the negative relationship between women in government and the perception of corruption. Erlich and Beauvais (2023) describe the situation in post-communistic countries, where the share of female politicians is low after abolishing the gender quotas stipulated by the Soviet Union, and levels of corruption are high.

Bauhr and Charron (2021) investigate the relationship in the question at the municipal level in France. Their findings bring important insights into the adaptation of corrupt behaviour over time. Women mayors who are new in the office support the findings of an inverse relationship between women politicians and corruption risk, while re-elected women mayors are not in line with this. The research focusing on the sub-national (regional) level of the government is provided also by Jha and Sarangi (2018), where the share of women in the sub-national governments has an inverse relationship with the corruption perception, too. Brollo and Troiano (2016) investigated the impact of women mayors on corruption finding a negative

relationship, too. Sundström and Wängnerud (2016) provided research on 18 European countries, taking into account local governments, with outcomes similar to Brollo and Troiano (2016) and Jha and Sarangi (2018).

However, the literature on gender-based evaluation of corruption generally tends to conclude the negative relationship between the share of women in politics and the level of corruption. Oppositely, a group of authors (e.g. Schwindt-Bayer et al., 2018; Bauhr and Charron, 2021) find no evidence of such a relationship or identify situations in which the negative relationship between the share of women in politics and the level of corruption is not observed. In this research, considering the heterogeneity of the sample of EU 27 countries, we regard different initial conditions of EU members. Pointing to lower levels of women in politics in post-communistic countries and higher levels of corruption when compared to established democracies in the EU with higher GDP per capita, we focus on the non-linear relationship between the share of women in politics and the level of corruption. We work with an assumption, that the share of women in politics should reach a certain level to observe their potential impacts on the level of corruption.

### 3 Methods and Data

In this paper, the non-linear relationship between the number of women in parliament and two different measures of corruption is

examined in the sample of 27 EU countries in the period 2001-2021. The nonlinear relationship is estimated using econometric modelling based on the panel data approach. We run two regressions based on two different expressions of corruption. We employ the Control of Corruption Index and Corruption Perception Index provided by the World Bank (2023) to measure corruption. These two indicators of corruption serve as the dependent variables. Similarly proceed e.g. Jha and Sarangi (2018), but use the negative of the Control of Corruption Index, because, in the case of the original index, higher values imply less corruption (World Bank, 2023; see Table 1 for variables' description), and thus the negative relationship between the original corruption indices and women representation in politics should express the increasing corruption perception with an increasing number of female politicians. For this reason, we focus on seeking the positive relationship between the original indices of corruption and the share of women in politics. Dollar, Fisman, and Gatti (2001) similarly interpret their results, thus they find a positive sign of the beta estimate for the variable focusing on the percentage of women in parliament.

The explanatory variable is the share of women in parliament (see Table 1). Jha and Sarangi (2018) use an indicator of women's presence in parliament. Similarly proceed Sundström and Wängnerud (2016).

Table 1 Descriptive statistics

Variable	Characteristics	Source	Obs.	Min	Max	Mean	Stdeva
<b>Dependent variables</b>							
Corruption Perception Index	Indicator of perceptions of public sector corruption, i.e. administrative and political corruption. 100 = no corruption. Expressed in logarithm.	Transparency International	550	3.2581	4.5951	4.0930	0.2829
Control of Corruption*	Perceptions of the extent to which public power is exercised for private gain, including petty and grand forms of corruption, as well as capture of the state by elites and private interests. Range -2.5 weak; 2.5 strong.	The World Bank	540	-0.4400	2.9000	1.0195	0.8230
<b>Explanatory variable</b>							
Women	Logarithm of women in parliament - the percentage of parliamentary seats in a single or lower chamber held by women.	The World Bank	564	2.0399	3.8561	3.1251	0.4529
Women2	Logarithm of women in parliament squared	Own	564	4.1613	14.869	9.9713	2.7700
<b>Control variables</b>							
Public deficit	Net lending/ net borrowing as % of GDP	Eurostat	567	-32.100	5.6000	-2.6342	3.5682
Inflation rate	Percent change in the Consumer Price Index.	The World Bank	567	-4.5000	34.500	2.3379	2.6820
FDI	Foreign Direct Investment, net inflows of investment% of GDP.	The World Bank	566	-117.42	7509.0	25.341	317.87
Unemployment rate	Share of the labour force that is without work but available for and seeking employment.	The World Bank	567	1.7810	27.470	8.5538	4.3254
GDPpc	Logarithm of GDP per capita in market prices in EUR.	Eurostat	567	7.4747	11.543	9.8406	0.7593
Crisis 2009	Dummy variable for the year 2009	Own	567	0.0000	1.0000	0.0476	0.2132
Human development index	Measure of three basic dimensions of human development: long and healthy life, knowledge, and a decent standard of living. Range 0-1.	United Nations	560	0.7150	0.9550	0.8613	0.0472
Median Age	Median age of the population.	Eurostat	567	32.600	47.600	40.424	2.6713

Note: \* Data available since 2002

When controlling for corruption, control variables are chosen in line with the literature on determinants of corruption. Cariolle (2018) mentions the determinants of corruption capturing economic development, human development, state size, trade, and democracy. A standard measure of the countries' economic development is GDP per capita (Sundström and Wängnerud, 2016; Jha and Sarangi, 2018; Cariolle, 2018) in the form of its logarithm (Sundström and Wängnerud, 2016; Jha and Sarangi, 2018). As a proxy for human development and human capital Brollo and Troiano (2016) employ the literacy rate, Sundström and Wängnerud (2016) employ the variable of education, and Jha and Sarangi (2018) employ the number of schooling years. We use a Human Development Index and median age to express the awareness of the population, assuming that a higher age points to higher awareness. To express openness or trade, usually, the net export variable is used in the literature on

corruption determinants (e.g. Cariolle, 2018; Jha and Sarangi, 2018). Countries with lower barriers to international trade are less corrupt. Jha and Sarangi (2018) comment on the economic and human development of countries. According to them, richer countries may tackle better corruption. Besides, corruption is lower with higher levels of human capital, because people are aware of their rights. In a very similar sense proceed Sundström and Wängnerud (2016). They introduce in their research a dummy variable for Central and East European countries. They mention several important issues tied to determinants of both corruption and women's representation in politics. According to them, countries more developed in the economic and human fields (higher GDPpc and higher level of education) evidence higher shares of elected female politicians. In line with this, Erlich and Beauvais (2023) mention that in post-communist countries women's representation in government has been low,

since the fall of the Soviet Union which respected gender quotas. For this reason, in the second step of the analysis, we divide the sample of EU member countries into new and old EU members. Cariolle (2018) employs a variable of democracy, but he runs the research on developing countries. Our sample consists of developed countries, so there are low differences among EU members in terms of the degree of democracy. According to data provided by Polity IV (2023), in the EU all countries are full democracies and democracies in the period since 2001.

To estimate the relationship between women in parliament and two different measures of corruption in the sample of 27 EU countries in the period 2001-2021 and two sub-samples, respectively, we use panel data models. We employ the fixed-effect models (FEM) or random-effect models (REM) referring to the Hausman test. To express the basic econometric formula, we can use the following:

$$\text{Corruption Perception Index}_{it} = \beta_0 + \beta_1 \text{Women}_{it} + \beta_2 \text{Women}_{it}^2 + \sum_{k=3}^L \beta_k \text{Control variables}_{kit} + \varepsilon_{it} \tag{1}$$

and altering the dependent variable:

$$\text{Control of Corruption}_{it} = \beta_0 + \beta_1 \text{Women}_{it} + \beta_2 \text{Women}_{it}^2 + \sum_{k=3}^L \beta_k \text{Control variables}_{kit} + \varepsilon_{it} \tag{2}$$

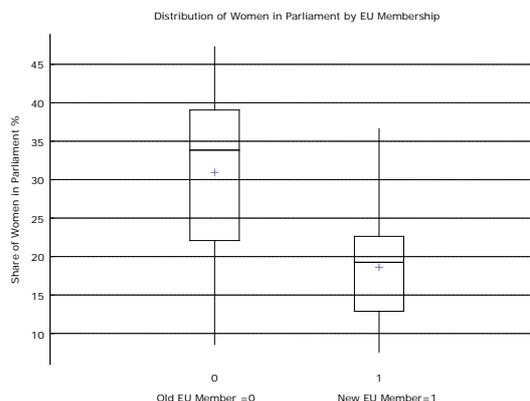
In the next step of the analysis the moment of the EU accession in 2004 is taken into account and the sample of 27 EU countries is divided into two subsamples – old and new EU member (old - Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, and Sweden; new – Bulgaria, Croatia, Cyprus, Czechia, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia

and Slovenia. Thus the equations (1) and (2) are used again, but for two sub-samples separately.

**4 Results and Discussion**

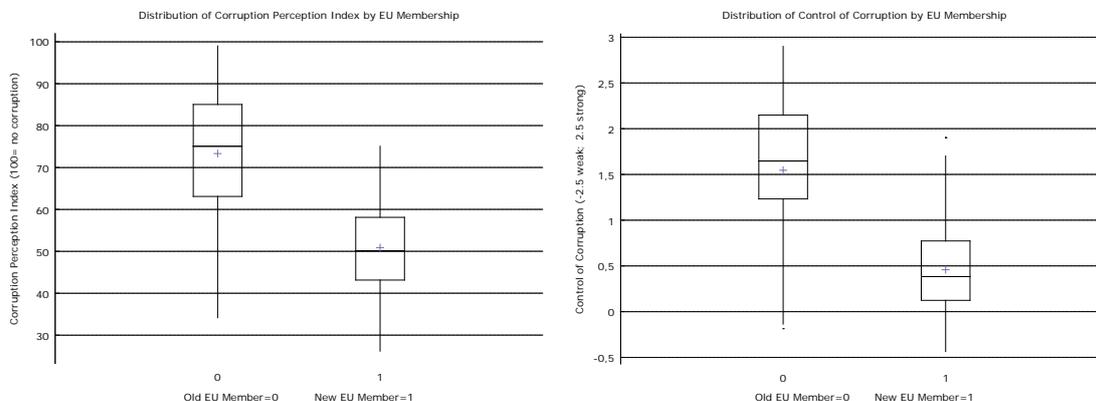
Analyzing the shares of women in parliament in the EU in 2001-2021, it is obvious, that these shares differ according to the countries’ access to the EU (see Figure 1). In the case of old EU members, the shares of women in parliament are higher than in the case of new EU members.

Figure 1: Distribution of women in parliament by EU membership



Analyzing the levels of corruption, it is possible to see evident differences between old and new EU members, again (see Figure 2). Both corruption indices (higher values of indices mean less corruption) are higher in the case of old EU member countries when compared to new EU members. Results projected in Figure 1 and Figure 2 are in line with the findings of Erlich and Beauvais (2023).

Figure 2: Distributions of corruption levels by EU membership



In the first step of the econometric analysis, we run the estimation on the whole sample of 27 EU countries without dividing them according to their access to the EU. Figure 3 projects the dependencies of the corruption indices and shares of women in parliament in 27 EU countries in 2001-2021 with a non-linear trend. The results of estimation for the full sample, 27 EU countries, are shown in Table 2.

It is important to mention, that the differences between old and new EU members are obvious. Besides, the representation of new EU members in the sample of 27 EU countries is evident and it could create a strong impact on the final results for the whole sample of EU countries

Figure 3: Relationship between the shares of women in parliament and corruption indices

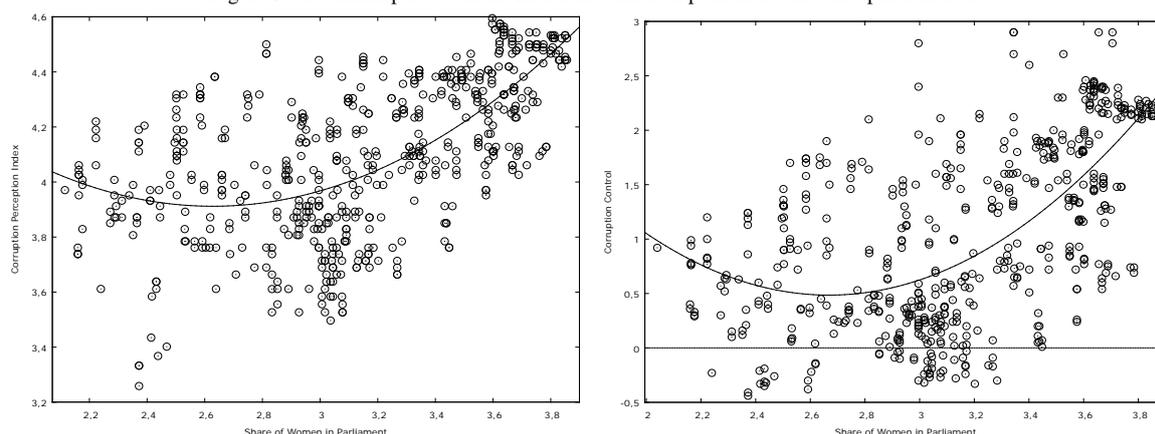


Table 2 displays the results of two models following the formulas (1) and (2) mentioned in the section on data and methods. Our findings point to the non-linear relationship between the women's share in parliament and corruption when the sign of the beta coefficient in the case of the women variable

is negative and in the case of women variable squares turns to positive. It means that the increase of women in parliament is related to higher corruption up to the point of turnover when the relationship turns positive. After passing the threshold, more women in politics are contributing to lower corruption.

Table 2: Estimation results, EU 27

Dependent variable	Corruption Perception Index		Control of Corruption	
	Model 1 FEM		Model 2 FEM	
Variables	Coeff.	Signif.	Coeff.	Signif.
Intercept	3.7961 (0.3032)	<0.0001 ***	2.6796 (0.7854)	0.0006 ***
Women	-0.5277 (0.1682)	0.0017 ***	-0.9358 (0.4519)	0.0384 **
Women2	0.0792 (0.0272)	0.0036 ***	0.1577 (0.0758)	0.0374 **
Public deficit	0.0030 (0.0013)	0.0223 **	-0.0031 (0.0030)	0.3011
Inflation rate	-0.0077 (0.00156)	<0.0001 ***	-0.0093 (0.0042)	0.0265 **
FDI	1.40e-05 (7.68e-06)	0.0682 *	-2.73e-05 (4.87e-05)	0.5752
Unemployment rate	-0.0047 (0.0014)	0.0006 ***	-0.0079 (0.0030)	0.0078 ***
lnGDPpc	0.2095 (0.0303)	<0.0001	0.4923 (0.0892)	<0.0001 ***
Crisis 2009	-0.0307 (0.0161)	0.0563 *	-0.0735 (0.0358)	0.0401 **
Human development index	-1.4605 (0.5732)	0.0108 **	-4.2570 (1.3400)	0.0015 ***
Median Age	0.0105 (0.0058)	0.0696 *	-0.0345 (0.0136)	0.0111 **
R2	0.3685		0.1514	
Hausman test p-value	<0.0001		<0.0001	

Notes: Standard errors in parentheses, \*\*\* denotes 1%, \*\* 5%, and \*10 % significance level.

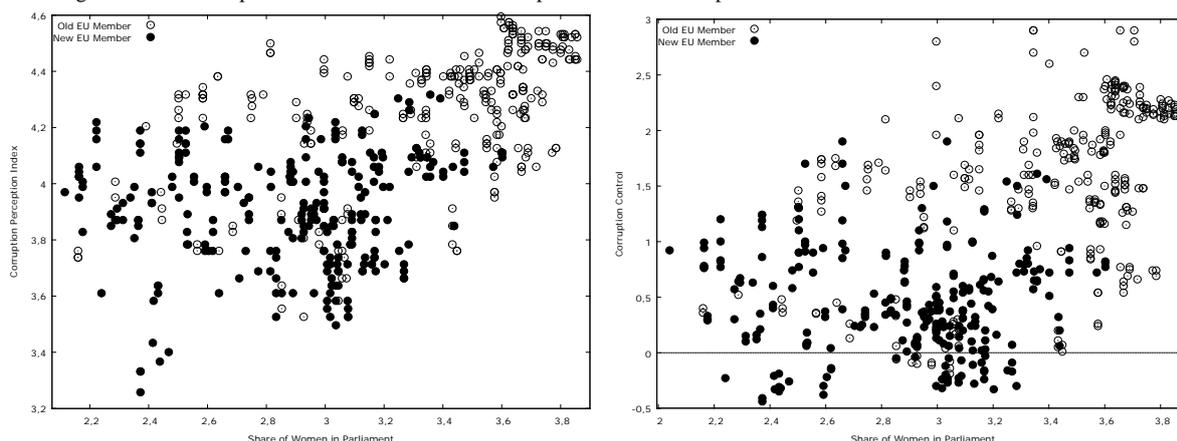
In the next step of the analysis, we focus on sub-samples of EU members regarding the 2004 EU accession moment. It divides the EU members according to the level of their development, too, considering the economic and political development (lower levels of initial GDP per capita, newly established democracies).

Figure 4 shows the dependencies of the Corruption Perception Index and the indicator of Control of Corruption on the share of women in the parliament according to the EU accession of the member states. The values for the old EU member states are located in the right top corner of both figures, where less corruption (perceived or controlled, higher values of indices) are

connected with higher shares of women in parliament. Contrary, in new EU member states, more corruption (perceived or controlled, lower values of indices) is connected with lower shares of women in parliament. This might lead us to the assumption, that the share of women in politics in new EU member states could be more critical when considering its impact on the level of corruption.

To remind, from the other point of view, the representation of new EU members in the sample of 27 EU countries is evident. It could create a strong influence on the final results for the whole sample of EU countries.

Figure 4: Relationship between the shares of women in parliament and corruption indices in old and new EU member countries



When estimating the relationship between the gender of politicians in the parliaments and corruption in various indices regarding the 2004 EU accession moment (see Table 3), it is evident, that the expected nonlinear relationship suit better the new EU members. Here, after passing a certain level of the share of women in the parliament, the positive impact of women

politicians on lower levels of corruption (perceived or controlled) is observed. In the case of old EU member states, the coefficients for women variables are not statistically significant and we might suppose the adequacy of the linear model to estimate the relationship in the question instead of the non-linear model.

Table 3: Estimation results, new and old EU members

Dependent variable	Corruption Perception Index				Control of Corruption			
	New EU Members		Old EU Members		New EU Members		Old EU Members	
	Model 3 FEM	Model 4 FEM	Model 5 FEM	Model 6 FEM				
Variables	Coeff.	Signif.	Coeff.	Signif.	Coeff.	Signif.	Coeff.	Signif.
Intercept	4.1688 (0.4695)	<0.0001 ***	6.2145 (0.4879)	<0.0001 ***	3.7887 (1.2066)	0.0017 ***	-0.3545 (1.5023)	0.8135
Women	-1.5067 (0.3027)	<0.0001 ***	-0.1058 (0.2565)	0.6800	-2.4217 (0.8225)	0.0032 ***	0.5860 (0.7745)	0.4493
Women2	0.2471 (0.0521)	<0.0001 ***	0.0201 (0.0404)	0.6184	0.4012 (0.1420)	0.0047 ***	-0.0799 (0.1242)	0.5199
Public deficit	0.0068 (0.0024)	0.0045 ***	0.0002 (0.0013)	0.8986	0.0046 (0.0056)	0.4152	0.0082 (0.0036)	0.0250 **
Inflation rate	-0.0044 (0.0017)	0.0094 ***	-0.0098 (0.0035)	0.0046 ***	-0.0037 (0.0041)	0.3639	-0.0203 (0.0113)	0.0734 *
FDI	0.0004 (0.0001)	0.0019 ***	1.17e-06 (2.68e-06)	0.6621	0.0005 (0.0003)	0.1235	-2.77e-05 (4.65e-05)	0.5512
Unemployment rate	-0.0034 (0.0020)	0.0810 *	-0.0062 (0.0016)	<0.0001 ***	-0.0050 (0.0050)	0.3162	-0.0101 (0.0049)	0.0417 **
lnGDPpc	0.1648 (0.0465)	0.0004 ***	-0.1424 (0.0411)	0.0005 ***	0.2979 (0.1302)	0.0222 **	0.7680 (0.1924)	<0.0001 ***
Crisis 2009	0.0002 (0.0289)	0.9933	-0.0332 (0.0194)	0.0863 *	-0.0690 (0.0548)	0.2087	-0.0813 (0.0571)	0.1543
Human development index	0.0137 (0.5983)	0.9818	-0.7156 (0.4742)	0.1313	-3.2785 (1.4334)	0.0222 **	-5.4229 (1.8575)	0.0035 ***
Median Age	0.0130 (0.0078)	0.0947 *	0.0090 (0.0055)	0.1001 *	0.0073 (0.0192)	0.7025	-0.0539 (0.0178)	0.0024 ***
R2	0.5812		0.1989		0.1401		0.2595	
Hausman test p-value	<0.0001		<0.0001		<0.0001		<0.0001	

Notes: Standard errors in parentheses, \*\*\* denotes 1%, \*\* 5%, and \*10 % significance level.

## 5 Conclusion

The gender-based evaluation of corruption takes place in the current research because the share of women in politics became a considered indicator of the modernization of the country.

The literature on gender-based evaluation discusses the expected negative relationship between the share of women in politics and the level of corruption. This paper investigates the relationship between women politicians and the level of corruption on a panel of EU 27 countries in the period 2001-2021. In this paper, the usual expectation of a linear relationship between women in politics and corruption is replaced by the non-linear assumption, when admitting both the positive and negative impact of women on corruption. The reason rests in considering the important differences among EU countries. The heterogeneity of the EU members when evaluating their initial economic and political conditions is evident. We regard the development of post-communistic countries performing the progress in public sector

modernization. We work with an assumption, that the share of women in politics should reach a certain level to achieve their potential impacts on the level of corruption.

The results confirm the assumption of a non-linear relationship between women in politics and the corruption level in the case of the whole sample of EU members in the period 2001-2021. When dividing the sample into new and old EU members, the non-linear relationship is confirmed for the new EU member states, while the same model does not suit the sample of old EU members. In the new EU member states, the share of women in parliament has to achieve a certain level to observe the inverse relationship between women politicians and corruption. The strong representation of new EU members in the sample of 27 EU countries (13/27) might influence the results of the whole sample.

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**Primary Paper Section: A****Secondary Paper Section: AD**