# Does Democracy Flourish in the Dark? Regional Development and Democracy Building

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## Abstract

This paper examines the impact of regional development on democracy building in the Czech Republic following the fall of the Iron Curtain and the autocratic communist regime in 1989. By exploiting the variation in regional development arising from the economic transition process, we identify that regional development, approximated by nighttime light intensity growth, leads to a rise in voter turnout in parliamentary elections. The heightened voter turnout is associated with increased electoral support for pro-system, pro-democratic parties, indicating that regional development facilitates democracy building. Conversely, we find no effect of regional development on the electoral support for the direct successor of the pre-1989 Communist Party. This suggests that while regional development may mitigate anti-system sentiment, it does not eliminate nostalgia for the fallen autocratic regime.

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# Regional Development and Democracy Building*

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## Abstract

This paper examines the impact of regional development on democracy building in the Czech Republic following the fall of the Iron Curtain and the autocratic communist regime in 1989. By exploiting the variation in regional development arising from the economic transition process, we identify that regional development, approximated by nighttime light intensity growth, leads to a rise in voter turnout in parliamentary elections. The heightened voter turnout is associated with increased electoral support for pro-system, pro-democratic parties, indicating that regional development facilitates democracy building. Conversely, we find no effect of regional development on the electoral support for the direct successor of the pre-1989 Communist Party. This suggests that while regional development may mitigate anti-system sentiment, it does not eliminate nostalgia for the fallen autocratic regime.

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# 1 Introduction

The latest V–dem report (Nord et al. 2024) provides a unique perspective on the democratization and autocratization processes around the World. Between 2003 and 2023, the democratization process failed in 19 countries and was replaced with autocratization, highlighting the fragility of young democracies. The success of democracy building depends on many factors such as income level (Acemoglu et al. 2008; Gassebner, Lamla, and Vreeland 2013), income inequality (Muller 1995; Boix 2003; Acemoglu and Robinson 2006), natural resources (Rød, Knutsen, and Hegre 2020), democratic neighborhood (Gleditsch and Ward 2006; Gassebner, Lamla, and Vreeland 2013), diverse ethnic, linguistic, and religious composition within the population (Alesina et al. 2003), social capital (Kunioka and Woller 1999), or law-abiding bureaucracy (Rød, Knutsen, and Hegre 2020). Income and economic development are among the most studied potential determinants of democratization. While there is no consensus on whether higher income leads to autocracies transitioning into democracies (see, e.g., Lipset 1959; Przeworski 2000; Gassebner, Lamla, and Vreeland 2013; Rød, Knutsen, and Hegre 2020), the recent literature suggests—with some exceptions such as Acemoglu et al. (2009)—that countries with higher levels of economic development tend to have more stable democracies (Gassebner, Lamla, and Vreeland 2013; Rød, Knutsen, and Hegre 2020).

Participation of citizens in the electoral process is an essential part of democracy and democracy building. However, the theoretical predictions on the link between economic performance and voter turnout are ambiguous. The *mobilization effect* suggests that voters have stronger motivation to punish than to reward (Lau 1982), i.e., that economic distress could increase participation as individuals seek to address challenges, while economic prosperity may decrease voter engagement due to a sense of satisfaction (Schlozman and Verba 1979; Burden and Wichowsky 2014). Conversely, the *withdrawal effect* proposes that bad economic times and inequality may reduce voter turnout, especially among low-income individuals (Rosenstone 1982). Empirical literature shows that voters are more likely to respond with increased voter turnout to extremes—strong or weak economic performance—while their electoral participation may decrease when economic conditions are moderate (Hansford and Gomez 2010; Martins and Veiga 2013). Last but not least, some studies find no significant impact of economic performance on voter turnout (Blais and Dobrzynska 1998; Blais 2000).

Empirical literature considers the impact of economic performance on voting behavior from multiple perspectives. While the *egocentric* or *pocketbook voting* literature assumes purely self-interested voters who only consider their own economic situation (Nannestad and Paldam 1994; Elinder, Jordahl, and Poutvaara 2008), Lewis-Beck and Stegmaier (2007) show that the empirical evidence of pocketbook voting is rather weak and Kinder and Kiewiet (1981) present evidence for *sociotropic voting* where voters base their decisions on their assessment of the national economy's performance. The last strand of the literature considers *communotropic voting*, which emphasizes the role of relative regional economic performance (Rogers 2014).

We add to this literature by studying the impact of regional development measured at the municipal level by nighttime light intensity on voter turnout. We focus on a special case of

democracy building in the Czech Republic after the fall of the autocratic communist regime. After the 1989 Velvet Revolution, the Czech Republic started a deep transition process from a centrally planned to a market economy and from autocracy to democracy. We exploit a variation in regional development—created within the process of economic transition—to estimate its impact on political participation in the parliamentary elections of the transition period held between 1996 and 2013. Our results show that an increase in nighttime light intensity by 1% is associated with an increase in voter turnout in parliamentary elections by 1.7%. This increase is driven by electoral support of pro-system democratic parties, suggesting the regional development to support democracy building. We also implement two strategies to identify the causal effect of regional development. Both yield results consistent with baseline regressions in terms of voter turnout.

## 2 Historical and institutional background

In 1948, the Communist Party took power in the so-called Prague Coup in the Czech Republic (then Czechoslovakia), and immediately started to install a Soviet-style autocratic regime characterized by a total power dominance of the Party. Other parties and civic organizations were allowed to exist only as a part of a Communist Party-controlled umbrella organization (*"Národní fronta"*) stripped out of their original ideology, purpose, and leadership. Beyond the political and social structures, the ruling Communist Party also completely transformed the economy. The regime built a centrally planned economy that operated on the basis of political interests and directives rather than market forces, resulting in structural and spatial imbalances in economic activity. For instance, heavy industry was prioritized over light industry and services (Sachs 1996; Teichová 2013). As a result, nighttime light intensity—the only granular indicator of economic activity available for the transition period—was highly concentrated in large cities and clusters with a high concentration of mining and heavy industry in the northeast and northwest close to the border with former East Germany and Poland at the beginning of the transition period (see Figure 1).

The communist regime fell—along with many of its Eastern European counterparts—in the late fall of 1989 in the so-called Velvet Revolution. Forty years of the communist autocracy destroyed all democratic institutions that had to be built anew. Czechoslovakia and the Czech Republic—a successor state that arose from a peaceful dissolution of Czechoslovakia on December 31$^{st}$ 1992—turned to building a democracy based on a party-list proportional representation electoral system. The key legislative body of the system—that also gives a vote of confidence to the government—is the Chamber of Deputies of the Parliament, with 200 deputies elected for four-year terms. Overall, the democratization process was successful. The country reached the EU15 level of V-dem democracy indicators within two years and maintained it without substantial relapses that affected other central European countries such as Poland and Hungary (see Figure 5 in the Appendix).

The political arena of the 1990s and 2000s was dominated by newly established political parties covering the entire left- to right-wing spectrum. Their decisive majority were democratic parties that shared a pro-Western orientation and struggled to integrate the Czech Republic into international structures such as the OECD (1995), NATO (1999), and the EU (2004). There were
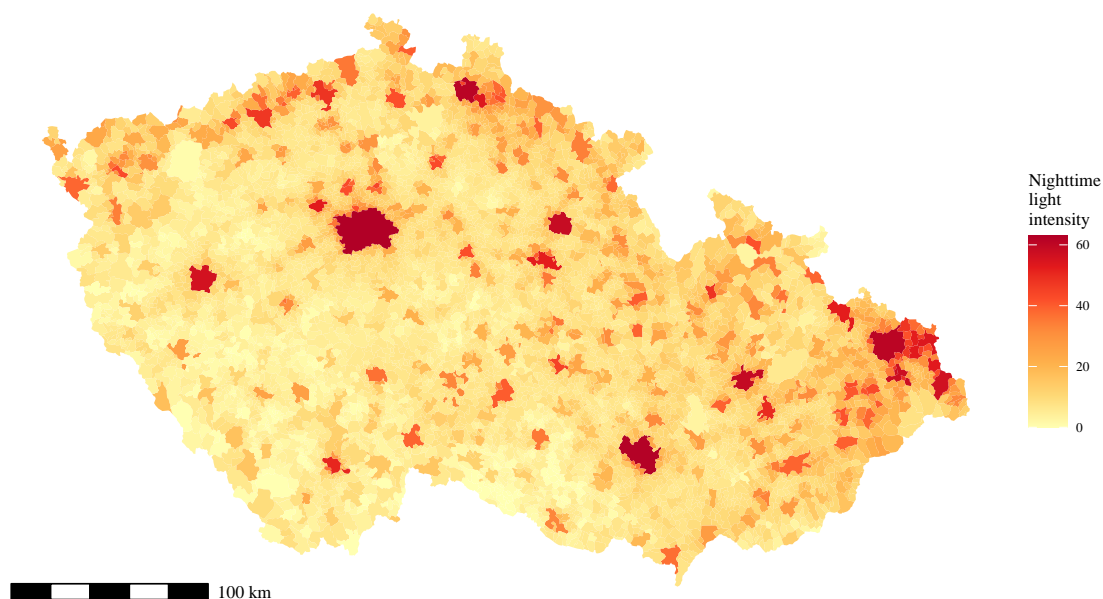
Figure 1: Mean nighttime light in 1992 by municipality

two exceptions that managed to pass the 5% electoral threshold. A far-right extremist party "Rally for the Republic – Republican Party of Czechoslovakia" (SPR-RSČ) which won 14 and 18 seats in the 1992 and 1996 elections, respectively. However, SPR-RSČ never took part in the government and was not considered a partner by democratic parties. The other and more notable exception was the "Communist Party of Bohemia and Moravia" (KSČM)—a direct successor of the pre-1989 communist party that was never outlawed and never transformed into a modern left-wing party, maintaining the continuity with its pre-1989 predecessor (Hloušek 2010). Even in the first post-1989 elections held in 1990, the communist party succeeded in winning 33 seats. The electoral support for the party was comparable across municipalities regardless of the number of eligible voters (i.e., adult population) or the level of economic development measured by nighttime light (see Figure 4 in the Appendix). The communist party maintained stable electoral support even in the rest of the observation period (see Section 3); however, it never took part in the government.

The 2010 and 2013 elections brought a change to the political landscape when established political parties lost some of their voters to newly established parties based on anti-corruption rhetoric and critique of the old pro-system parties (Kuba, Hudec, and Stejskal 2023). However, these new political parties did not question the democratic system itself or the pro-Western orientation of the country. Moreover, a short-lived political party, "Public Affairs" (VV), and the substantially more successful "Action of Dissatisfied Citizens" (ANO), eventually took part in governing coalitions after the 2010 and 2013 elections, respectively.

In parallel with the successful process of democracy building, the Czech Republic underwent another demanding process: the economic transition to a market economy. Similar to the political transition, the economic transition was quite fast. According to the EBRD transition indicators

that measure the progress of reforms,[1] the Czech Republic reached "standards and performance typical of advanced industrial economies" in three out of six evaluated categories before 2000 (see Figure 6 in the Appendix). As smooth as the transition to a market economy has been, it has not been without costs. Market forces revealed structural imbalances and overinvestments in certain economic sectors and regions. Unavoidable disinvestments resulted in local declines in economic activity and increases in unemployment. On the other hand, the fall of the Iron Curtain made the Western market potential accessible in Eastern European countries, bringing increased economic development, especially in border regions (Brülhart 2011; Brülhart, Carrère, and Trionfetti 2012; Brülhart, Carrère, and Robert-Nicoud 2018). Some regions and municipalities, therefore, benefited more than others from the economic transition, giving rise to relative winners and losers (Sachs 1996). Changes in relative nighttime light intensity between 1992 and 2013[2] depicted in Figure 2 show that municipalities located near the border with West Germany and Austria or in the proximity of large cities improved their relative position to the country's average, while the industrial clusters created before 1989 (often located near the border with Poland and East Germany) were losing.

## 3   Data and empirical strategy

Our empirical strategy exploits the variation in regional development at the municipal level created by exogenous shocks—economic transition, and the borders opening—to estimate the impact of regional development on voting behavior.

We combine two principal data sources: (a) Data from the Defense Meteorological Satellite Program (DMSP) Operational Linescan System (OLS) measuring nighttime light emitted by stable lights[3], and (b) Administrative municipality-level data from parliamentary elections[4].

Remotely sensed nighttime light intensity is a proxy used for identifying clusters of economic activity and approximating economic growth and development (Henderson, Storeygard, and Weil 2012; Chen and Nordhaus 2011; Elvidge et al. 2007; Rybnikova and Portnov 2015). DMSP, available for the period 1992–2013, is the only data source that covers the period of economic transition in the spatial resolution (approx. 1 km at the equator) that allows for an approximation of economic development at the level of municipalities. In the DMSP, nighttime light intensity (NL) is measured on a scale from 0 to 63, where 0 indicates the absence of light, and 63 is a top-coded maximum luminosity. We average DMSP data, adjusted for moonlight and other natural light

1. For data and evaluation methodology see https://www.ebrd.com/economic-research-and-data/transition-qualities-asses.html (last accessed on May 9, 2024).

2. Using remotely sensed nighttime light data from the DMSP dataset, we construct the following index (RNL) that captures changes in relative nighttime light intensity between 1992 (first year available) and 2013 (last year available and the end of observation period):

$$\text{RNL}_i = 100 \left( \frac{\text{NL}_{i,2013}}{\overline{\text{NL}}_{2013}} - \frac{\text{NL}_{i,1992}}{\overline{\text{NL}}_{1992}} \right) \tag{1}$$

where NL nighttime light intensity in municipality is $i$, and $\overline{\text{NL}}$ is mean nighttime light intensity.

3. Data are available at https://ngdc.noaa.gov/eog/dmsp/downloadV4composites.html.

4. Data for 2002–2013 elections are available at the website of Czech Statistical Office (CZSO, https://www.volby.cz/opendata/opendata.htm). Data from previous elections can be requested from CZSO at infoservis@czso.cz.
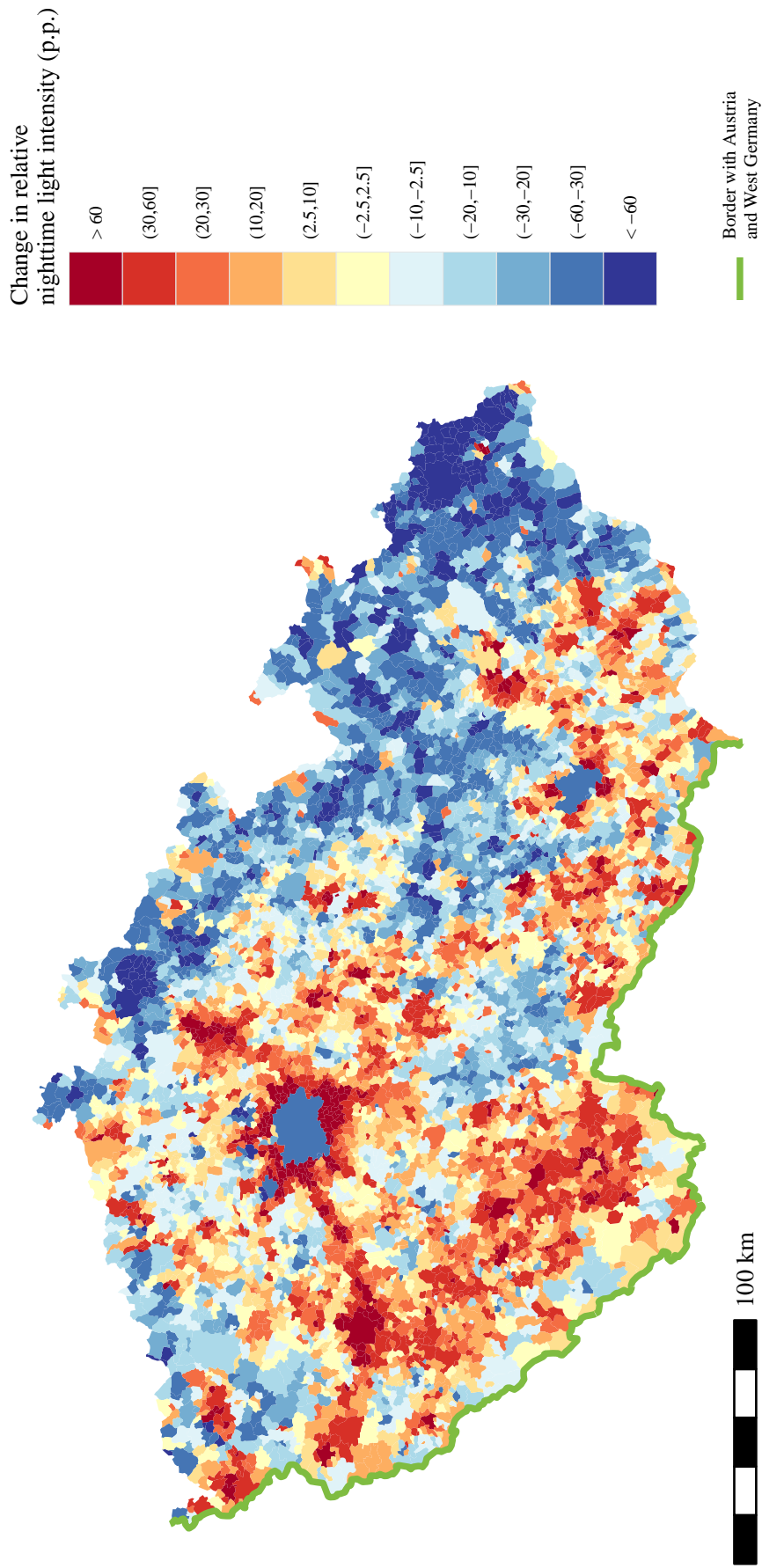
Figure 2: Changes in relative nighttime light intensity between 1992 and 2013: Winners and losers of economic transition

sources, for each municipality and year using the 2011 definition of municipalities. Panel (a) of Figure 3 shows a steady increase in nighttime lights in the 1990s followed by declines in 2006 and 2013 with averaged NL being equal to zero for 207 municipality and elections pairs.

Aggregated DMSP data are augmented with administrative data on parliamentary elections (including snap elections) held between 1992 and 2013 (1992, 1996, 1998, 2002, 2006, 2010, and 2013). For each municipality ($i$) and election ($e$) we use electoral data to calculate voter turnout ($v$) and electoral support ($s$) for political parties and their groups: incumbent parties, pro-system parties (i.e. parties that participated in the government between 1992 and 2013 with the exception of anti-corruption parties) and the communist party.[5] The electoral support is defined as follows:

$$s_{i,e} = 100 \frac{C_{i,e}}{V_{i,e}}, \tag{2}$$

where $C$ is the number of votes cast for a given party or parties, and $V$ is the total number of eligible voters. Panel (b) of Figure 3 shows a steady decline in voter turnout in elections that followed the 1989 Velvet Revolution that stabilized at the beginning of 2000s at around 60%. Some authors (e.g., Coufalová, Kolajtová, and Žídek 2023; Coufalová and Žídek 2023; Matějů 1996) explain this drop by the post-revolution euphoria fading away. Incumbent and pro-system parties (see panels (c) and (d)) experienced a decline in electoral support in 2010 and 2013 elections when they lost some of their voters to newly established parties (VV and ANO, see above) based on anti-corruption rhetoric and critique of the old pro-system parties (Kuba, Hudec, and Stejskal 2023). The electoral support of the communist party (see panel (e)), which may capture anti-system sentiment as well as nostalgia for the pre-1989 system (see, e.g., Okulicz-Kozaryn 2014), was remarkably stable throughout the observation period.

We estimate the association between regional development and electoral outcomes (voter turnout, electoral support for incumbent and pro-system parties, and for the communist party) in the following regression:

$$\log(o_{i,e}) - \log(o_{i,e-1}) = \gamma \left( \log(\text{NL}_{i,e}) - \log(\text{NL}_{i,e-1}) \right) + \delta \log(\text{NL}_{i,e-1})$$
$$+ \theta_e + \theta_i + \varepsilon_{i,t} \tag{3}$$

Where $o$ is the electoral outcome. As we are interested in the impacts of economic development, we transform the outcome variables to growth rates as well. In the case of support for incumbent parties, we compare their support in the current elections ($e$) with their support at the beginning of their term (i.e., in $e-1$ elections). The variable of interest, approximating the regional development, is the growth rate of nighttime lights. To compensate for varying dates of elections in a year, we use the change between the year of previous elections and the year preceding the current elections. Further, we control for the log of the level of nighttime lights at previous elections, elections fixed effects ($\theta_e$), and a full set of municipality fixed effects including constant ($\theta_i$). Fixed effects control for systematic differences in municipalities and idiosyncratic shocks such as the

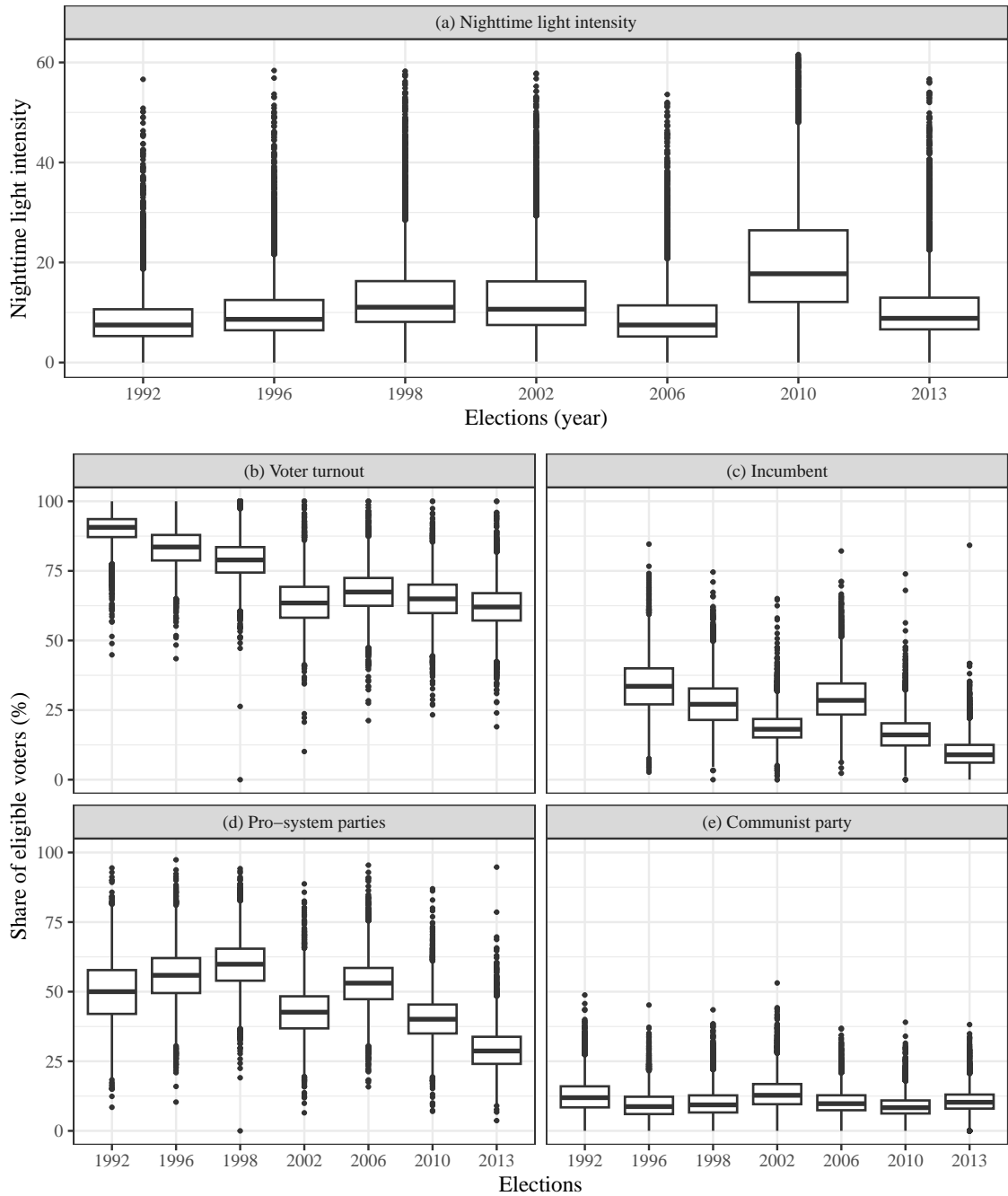5. For an overview of political parties and their categorization, see Table 3 in the Appendix.

Figure 3: Descriptive statistics: Nighttime light intensity, voter turnout and electoral support by municipality in election years.

macroeconomic situation or impacts of widely publicized political affairs. Due to concerns of the spatial autocorrelation in error term $\varepsilon$, we report Conley standard errors with 90 km cutoff[6] along with parameters estimated with a fixed effects estimator in all cases.

The regression (3) is specified with growth rates and logarithmic transformation. Such specification excludes from the estimation sample (a) the 1992 elections as the nighttime lights data are not available for the 1990 elections, and (b) observations with zeros in underlying dependent or independent variables (see Figure 3).

# 4 Results

Table 1 summarises results of regressions. Panel A contains results for the baseline specification. An increase in the nighttime light intensity by 1% is statistically significantly associated with an increase in voter turnout by 1.7% (see Column 1). The result from Column 3 suggests that the increased participation in the political process was driven by increased electoral support for pro-system political parties. The coefficient reported in Column 2 indicates, albeit being statistically insignificant, that incumbent parties may benefit from the increase in nighttime light, as it is comparable in absolute value with the elasticity estimated for pro-system parties. The support of the communist party (Column 4) is not sensitive to changes in nighttime light intensity. These results suggest that regional development may have contributed to democracy building in the transition period as it is associated with increased participation and the electoral support of pro-system, i.e. pro-democratic, parties. On the other hand, there is no evidence that regional development decreased support for the anti-system communist party.

## 4.1 Robustness analysis

The Czech Republic is characterized by a high number of municipalities (6,258 as of 2011) low in population. The median number of eligible voters was 307.5 in 2002 elections with 6.1% voters living in below-median municipalities. The baseline regressions reported in Panel A of Table 1 thus put a disproportional weight on small municipalities. We therefore re-estimate (3) as weighted regression with weights given by a number of eligible voters in each municipality and election. The results reported in Panel B are, in general, in line with baseline estimates. The estimated coefficients for voter turnout and electoral support of pro-system parties are, however, about three times larger, suggesting that electoral outcomes in larger municipalities are more closely correlated to changes in nighttime lights. Other estimates of parameter $\gamma$ are still statistically insignificant with the estimate for electoral support of incumbent parties being nowhere close to the support for pro-system parties in the weighted regression.

The 2010 and 2013 elections were marked by the emergence of new parties, which based their campaign on anti-corruption rhetoric and critique of the old pro-system parties. These parties, not classified as pro-system parties in our analysis, gained substantial support, especially in the 2013

6. The 90 km cutoff maximizes standard error of parameter $\gamma$ in regression (3) with voter turnout being the dependent variable.

Table 1: Regression results from panel regression

| | Dependent variable (growth rate in): | | | |
| --- | --- | --- | --- | --- |
| | | Electoral support for | | |
| | Voter turnout | Incumbent parties | Pro-system parties | Communist party |
| | (1) | (2) | (3) | (4) |
| Panel A: Baseline specification | | | | |
| Nighttime light growth rate | 0.017*** | 0.028 | 0.032** | 0.005 |
| | (0.004) | (0.025) | (0.013) | (0.013) |
| Nighttime light intensity (log, $e - 1$) | 0.018*** | 0.045** | 0.076** | −0.025 |
| | (0.005) | (0.020) | (0.035) | (0.026) |
| Observations | 37,039 | 37,006 | 37,039 | 36,643 |
| Panel B: Weighted regression | | | | |
| Nighttime light growth rate | 0.048*** | −0.005 | 0.086*** | −0.014 |
| | (0.012) | (0.032) | (0.032) | (0.020) |
| Nighttime light intensity (log, $e - 1$) | 0.053*** | −0.128*** | 0.130*** | −0.121*** |
| | (0.008) | (0.045) | (0.045) | (0.033) |
| Observations | 37,039 | 37,006 | 37,039 | 36,643 |
| Panel C: 2013 Elections excluded | | | | |
| Nighttime light growth rate | 0.026*** | 0.010 | 0.043*** | 0.003 |
| | (0.006) | (0.026) | (0.012) | (0.017) |
| Nighttime light intensity (log, $e - 1$) | 0.027*** | −0.006 | 0.102*** | −0.034 |
| | (0.006) | (0.020) | (0.030) | (0.026) |
| Observations | 30,794 | 30,787 | 30,794 | 30,442 |
| Panel D: Sample of small municipalities | | | | |
| Nighttime light growth rate | 0.013*** | 0.014 | 0.019 | 0.002 |
| | (0.003) | (0.025) | (0.012) | (0.006) |
| Nighttime light intensity (log, $e - 1$) | 0.012** | 0.040** | 0.050 | −0.008 |
| | (0.006) | (0.017) | (0.032) | (0.019) |
| Observations | 15,224 | 15,191 | 15,224 | 14,832 |
| Panel E: Results from 2SLS regression | | | | |
| Nighttime light growth rate (instrumented) | 0.130*** | −0.502 | −0.533 | 0.726 |
| | (0.040) | (0.536) | (0.522) | (0.548) |
| Nighttime light intensity (log, $e - 1$) | 0.029*** | −0.120 | −0.097 | 0.125 |
| | (0.007) | (0.100) | (0.096) | (0.101) |
| Education structure (1991) | Yes | Yes | Yes | Yes |
| Population structure (1991) | Yes | Yes | Yes | Yes |
| Observations | 37,030 | 36,998 | 37,030 | 36,637 |

Note: Estimates of regression (3) with Conley standard errors (90 km cutoff) reported in parentheses: *, ** and *** denote statistical significance at 10%, 5% and 1% level. Regressions in panels A–D are estimated with municipality and election fixed effects. Regressions in panel E are estimated only with the election fixed effects.

elections, when ANO became the second strongest party in the parliament. As the categorization of these parties is ambiguous—they criticize the system but at the same time participate in it—we re-estimate regression (3) with the 2013 election excluded. Results reported in Panel C are closely aligned to the baseline specification.

## 4.2   Causal effects of regional development

Regional development may be endogenous as political representation, and especially the incumbent parties may strategically distribute public investments and subsidies to reward or gain electoral support. In this case, the results from the baseline regression would be of a descriptive nature only. Hodler and Raschky (2014) raised this issue complicating the causal inference, who show regions where the current political leader was born tend to have higher nighttime light intensity and by Önder, Portmann, and Stadelmann (2018), who found Swiss representatives to be more likely influenced by referendum outcomes in the municipalities they live in compared to those in nearby areas. Vote-purchasing behavior was observed also by Tavits (2009) and Frey (2022).

The substantial increase in the coefficient estimated for pro-system parties in weighted regression may indicate such a strategic behavior of incumbent parties investing in larger cities to gain additional electoral support. To further test for the presence of such behavior, we estimate modified regression (3):

$$\log(\mathrm{NL}_{i,e}) - \log(\mathrm{NL}_{i,e-1}) = \mu X_{i,e} + \sigma \log(\mathrm{NL}_{i,e-1}) + \theta_e + \theta_i + \varepsilon_{i,t} \tag{4}$$

where we regress the growth in nighttime light intensity on a variable $X$, which is either support for incumbent parties at the beginning of the respective term, or a number of coalition or opposition members of parliament resident in the municipality. Results reported in Table 2 do not show any statistically significant association for either of these variables. However, these results must be interpreted with caution, especially for the support of incumbent parties (Column 1), as the tendency to reward past support and gain new one, may cancel out.

To identify the potential causal impact of regional development on voting behavior, we opt for two strategies. First, we follow the strategy suggested by Coufalová, Mikula, and Ševčík (2023). We limit our sample to small municipalities with the number of voters below 250. Voters in these municipalities could provide, on average, only 4.4% of votes (i.e., less than 5% electoral threshold), which makes them an unattractive target for strategic government spending. Results reported in Panel D in Table 1 are comparable to the baseline specification for the voter turnout, which remains positive and statistically significant. Estimates for electoral support for the incumbent and pro-system parties in Columns 2–3 are all insignificant albeit comparable in absolute value to the effect of nighttime light growth on voter turnout. The impact of nighttime light growth on the support for the communist party remains insignificant and close to zero in absolute value.

Estimates gained from the sample of small municipalities are likely to be free of the impact of potential strategic behavior of the government and are, therefore, more likely to capture the causal effect. However, their external validity is questionable due to the population sorting into small municipalities.

Table 2: Baseline results from panel regression

| | Dependent variable: | | |
| --- | --- | --- | --- |
| | Nighttime lights growth rate | | |
| | (1) | (2) | (3) |
| Nighttime lights intensity (log, $e - 1$) | −0.914*** | −0.914*** | −0.914*** |
| | (0.036) | (0.048) | (0.048) |
| Incumbent (log, $e - 1$) | −0.014 | | |
| | (0.012) | | |
| Resident members of parliament, coalition ($n$, $e - 1$) | | 0.0003 | |
| | | (0.004) | |
| Resident members of parliament, opposition ($n$, $e - 1$) | | | 0.005 |
| | | | (0.003) |
| Observations | 37,038 | 31,094 | 31,094 |

Note: Estimates of regression (4) with Conley standard errors (90 km cutoff) reported in parentheses: *, ** and *** denote statistical significance at 10%, 5% and 1% level. Regressions are estimated with the municipality and election fixed effects. Regressions in Columns 2–3 are estimated only with the data for post-1996 elections.

To avoid this drawback, we employ an alternative strategy that allows us to estimate the effect on the full sample of municipalities. We exploit a natural experiment that occurred along with the 1989 Velvet Revolution, which was one of the revolutions that tore down the Iron Curtain, and made the Western market potential accessible especially to border regions. Figure 2 shows that municipalities that benefited most, in relative terms, from the economic transitions were clustered along the border with countries of the West: Austria and West Germany. We exploit this clustering in IV framework where we use the inverse value of on-road distance to the nearest border crossing to Austria or West Germany[7] as an instrument for the nighttime light growth.

For the IV estimation (2SLS), we modify the specification of the regression (3) where we replace municipality fixed effects due the perfect co-linearity with the time-invariant instrument with the 1991 census data on age and education structure for each municipality. Second-stage results are reported in Panel E of Table 1. The minimum F-statistic for the first-stage regressions is 25.2. However, the instrument is only weakly statistically significant (for the first stage, see Table 4 in the Appendix), which adds additional noise to the second stage estimates. Coefficients from the second stage are substantially larger in magnitude, but despite the weak instrument, they follow the pattern observed in the sample of small municipalities, retaining the statistical significance for the voter turnout. The validity of exclusion restriction is questionable as the more intensive contact with the West was, on one hand side, likely to speed up economic regional development reflected by the nighttime light, but on the other hand, it could bring the experience with Western society and political institution, which can in turn strengthen the political participation *per se*.

7. On-road distances were calculated using GraphHopper 7.0 and OpenStreetMap extracts obtained from https://www.geofabrik.de/ as a route from the municipality reference points (as defined by the Czech Statistical Office) and nearest border crossing to West Germany or Austria.

# 5  Conclusion

This paper adds to the literature on economic voting by studying the effect of regional development on democracy building in the Czech Republic after the fall of the Iron Curtain and the autocratic communist regime in 1989. Exploiting variation in regional development created in the process of economic transition, we estimate the increase in nighttime light intensity by 1% to be associated with increased voter turnout in parliamentary elections by 1.7%. Increased voter turnout is driven by electoral support for pro-system pro-democratic parties, suggesting regional development to support democracy building. On the other hand, we do not find any effect of regional development on the electoral support for the Communist Party of Bohemia and Moravia (KSČM), a direct successor of the pre-1989 Communist Party (KSČ), suggesting that regional development cannot fully suppress anti-system sentiment or root out nostalgia for the pre-1989 system.

Baseline estimates might be driven by strategic investments of the government designed to obtain new votes or reward loyal voters. Such investments would make our measure of regional development—nighttime light intensity—endogenous. To address this concern, we implement two strategies. First, we limit our estimation sample only to small municipalities, which could not provide a substantial number of votes for the government. Secondly, we apply an IV framework using a distance to rich countries in the West as an instrument for the growth of nighttime light intensity. Results from both strategies show that regional development increased voter turnout without significantly affecting political preferences. Overall, our results suggest that regional economic growth may increase participation in political processes during democracy building.

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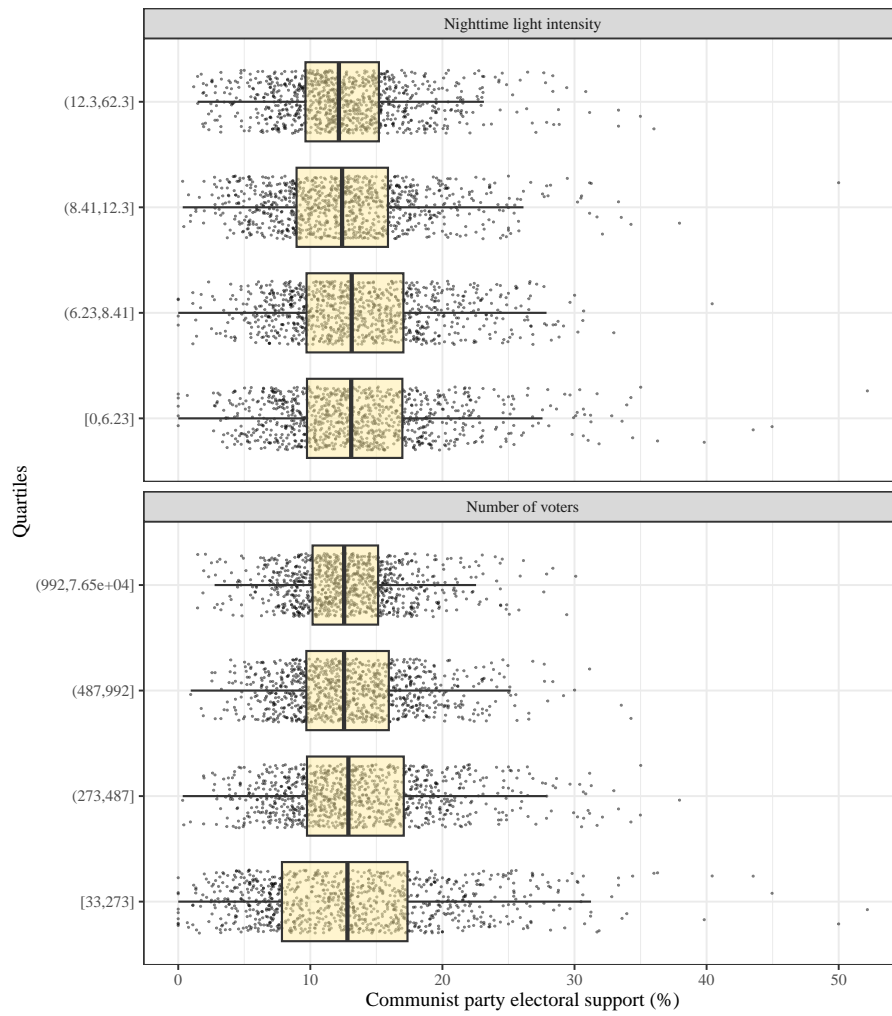
# Online Appendix



Figure 4: Electoral support of the Communist party in 1990 elections by number of voters (municipality size) and by nighttime lights intensity (as of 1992)
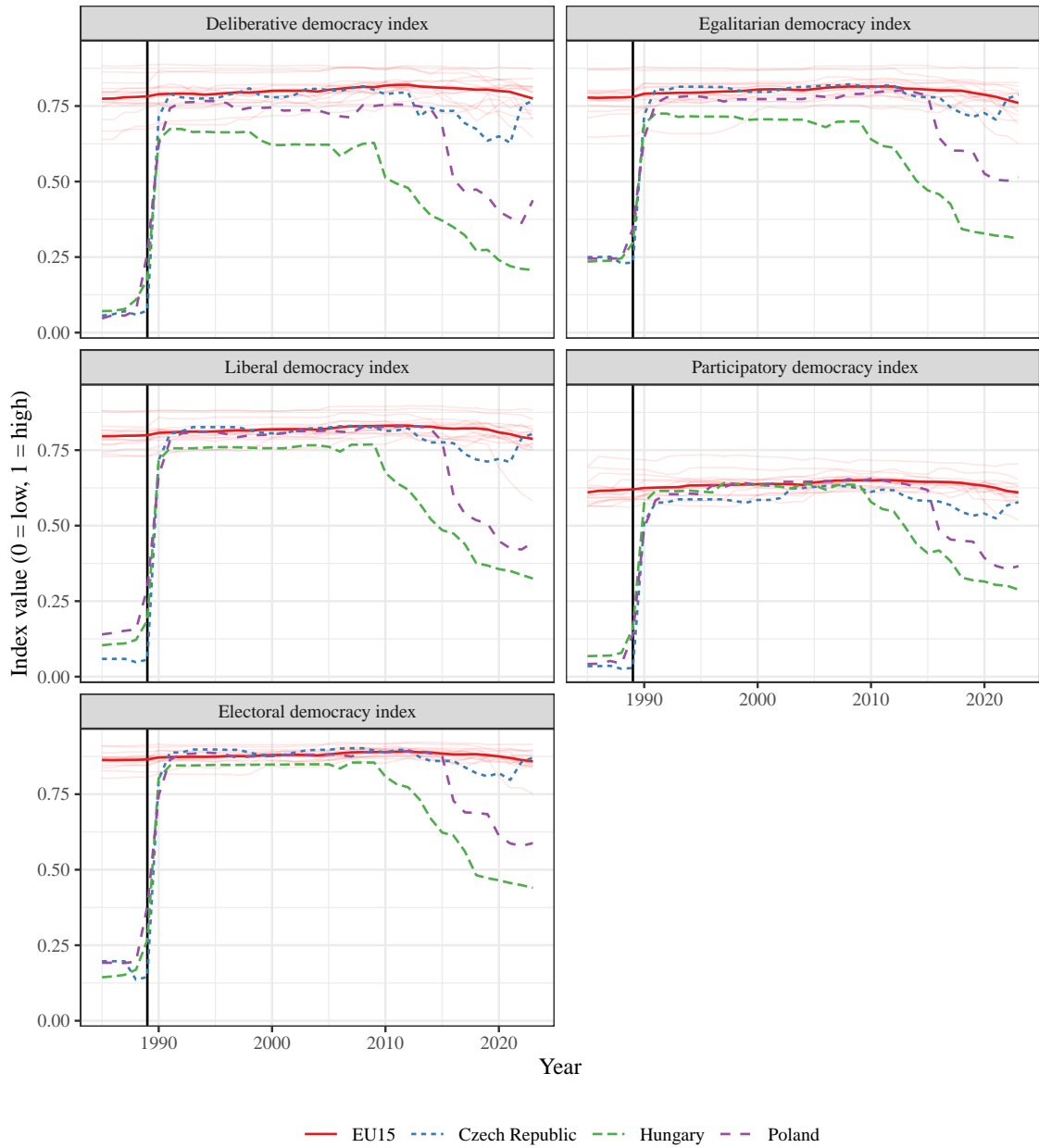
Figure 5: V-dem indices of democracy

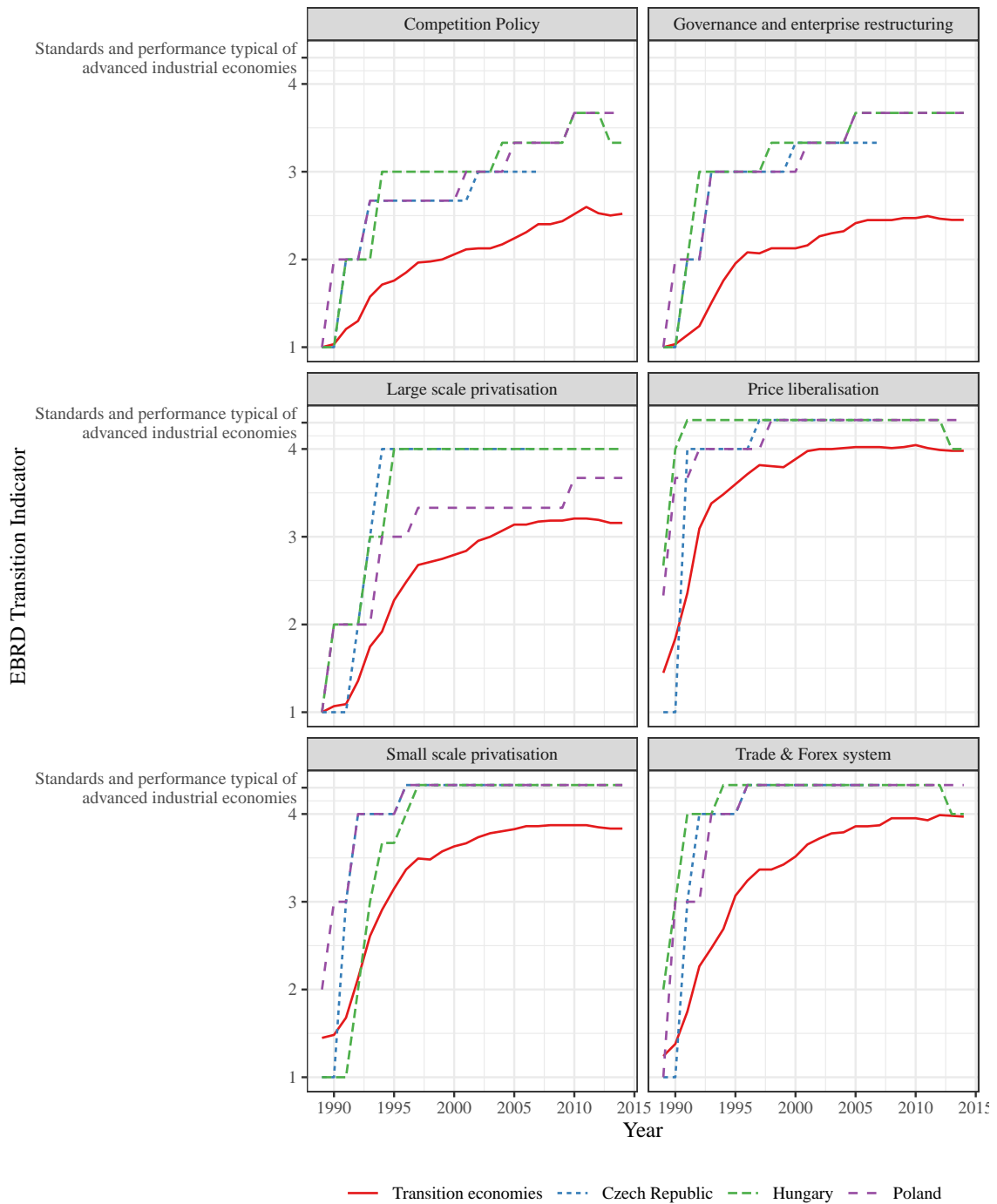Note: Values for individual EU15 countries are in light red.

Figure 6: EBRD Transition Indicators in the Czech Republic, Hungary, and Poland in comparison to mean of transition economies

Note: THe sample of evaluated transition economies covers Albania, Armenia, Azerbaijan, Belarus, Bosnia And Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, FYR Macedonia, Georgia, Hungary, Kazakhstan, Kyrgyz Republic, Latvia, Lithuania, Moldova, Mongolia, Montenegro, Poland, Romania, Russian Federation, Serbia, Slovak Republic, Slovenia, Tajikistan, Turkmenistan, Ukraine and Uzbekistan. Data and methodology are described at https://www.ebrd.com/transition-indicators-history (last accessed May 9, 2024).

Table 3: Political parties: Number of seats

| Political party | Parliamentary elections | | | | | | Pro-System party |
|---|---|---|---|---|---|---|---|
| | 1996 | 1998 | 2002 | 2006 | 2010 | 2013 | |
| Civic Democratic Party (ODS) | $68^i$ | 63 | 58 | $81^i$ | $53^i$ | 16 | Yes |
| Czech Social Democratic Party (ČSSD) | 61 | $74^i$ | $70^i$ | 74 | 56 | $50^i$ | Yes |
| Communist Party of Bohemia and Moravia (KSČM) | 22 | 24 | 41 | 26 | 26 | 33 | |
| Christian Democratic Union - Czechoslovak People's Party (KDU-ČSL) | $18^i$ | $20^i$ | | $13^i$ | | $14^i$ | Yes |
| Coalition for Republic – Republican Party of Czechoslovakia (SPR-RSČ) | 18 | | | | | | |
| Civic Democratic Alliance (ODA) | $13^i$ | | | | | | Yes |
| Freedom Union - Democratic Union (US) | | $19^i$ | | | | | Yes |
| Green Party (SZ) | | | | $6^i$ | | | Yes |
| Tradition Responsibility Prosperity 09 (TOP09) | | | | | $41^i$ | 26 | Yes |
| Public Affairs (VV) | | | | | $24^i$ | | Yes |
| Action of Dissatisfied Citizens (ANO) | | | | | | $47^i$ | |
| Dawn of Direct Democracy (ÚSVIT) | | | | | | 14 | |
| Coalition of KDU-ČSL and US | | | 31 | | | | Yes |

Note: $^i$ denotes that the party held a position in the government in the respective term, and we consider it an incumbent in the consecutive election. In case of multiple governments, we consider the one which held the office longest.

Table 4: First stage regression

| | Dependent variable: Nighttime lights growth rate | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Distance to the Western border ($1/d$) | −0.219* | −0.218* | −0.219* | −0.214* |
| | (0.117) | (0.117) | (0.117) | (0.116) |
| Nighttime lights intensity (log, $e − 1$) | −0.206*** | −0.206*** | −0.206*** | −0.203*** |
| | (0.034) | (0.034) | (0.034) | (0.034) |
| Education structure (1991) | Yes | Yes | Yes | Yes |
| Population structure (1991) | Yes | Yes | Yes | Yes |
| Observations | 37,030 | 36,998 | 37,030 | 36,637 |

Note: Estimates of regression (3) with Conley standard errors (90 km cutoff) reported in parentheses: *, ** and *** denote statistical significance at 10%, 5% and 1% level.

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