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Examining the spatial spillover of gambling regulation in the Czech Republic

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ABSTRACT

The responsibility of spatial regulation of gambling in the Czech Republic is placed on municipalities, the smallest self-governing units in the country. This creates a possibility that the effectiveness of regulation may be reduced by spatial spillover to the neighboring municipality. The aim of this paper is to evaluate to what extent the local reduction of gambling is effective in the overall reduction of gambling in the area under the conditions of fragmented regulation and mobility of gamblers. OLS regression was used to identify the spatial spillover effect. The decline in tax revenue on gambling machines in a district capital by one percentage point is associated with the rise of the same revenue in surrounding municipalities that are reachable in 10 min by 0.45 of a percentage point. Spatial spillover in more distant municipalities is close to zero. The results remain stable when control variables are employed. The results suggest that fragmented regulation is easy to overcome and better cooperation among municipalities or regulation on higher administrative level may be more effective.

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Gambling; regulation; spatial spillover; gambling machines; municipalities

1. Introduction

Gambling is a global public health and social problem that causes unwanted addictions and associated negative socio-economic externalities, such as higher crime rates and harm to individuals, families, and social communities (Collins & Lapsley, 2003; Thompson et al., 1997; Walker & Barnett, 1999; Walker & Kelly, 2011; Walker & Sobel, 2016; Walker, 2003). The accessibility of gambling products has increased greatly over the last two decades (St-Pierre et al., 2014; Vasiliadis et al., 2013), leading to an increase in gambling-related problems (M. W. Abbott et al., 2016; Williams et al., 2012). The Czech Republic is no exception to this trend, excluding lotteries, 8–19% of the adult population reported at least some participation in gambling activities. Within this group, 3–6% reported using gambling machines in brick-and-mortar establishments. According to the Lie/bet and PGSI scales, 80–100 thousand people – about 1% of the population – fall into the high-risk category of problem gambling in

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the long term. Among the group of gamblers who sought for treatment, 60% reported gambling machines as their main problem game (Mravčík et al., 2021).

The issue of the relationship between exposure to gambling and associated harm in the context of possible gambling strategies and policies has been discussed extensively in the past (M. W. Abbott, 2005; Orford, 2005a, 2005b; Room, 2005; Rönnberg, 2005; Shaffer, 2005). The relationship is positive in that the exposure of an individual to gambling opportunities increases the incidence and prevalence of problem gambling and related harm (Kristiansen & Lund, 2022; McCarthy et al., 2022; Orford, 2005b; Philander et al., 2022; Philander, 2019; Wardle et al., 2014). Aside from general availability, the crucial aspect to be considered is the proximity to gambling. The close availability of casinos and other gambling products is found to increase participation in gambling and related public health problems (M. W. Abbott et al., 2016; Papineau et al., 2020; Shaffer et al., 2004). A focus on problem gambling reveals that there is an increasing possibility of high problem gambling rates when gamblers live close to a gambling venue (M. W. Abbott et al., 2016; Philander, 2019; Shaffer et al., 2004; Welte et al., 2004). Studies stress that the presence of gambling venues in close proximity to potential gamblers increases their frequency of gambling (Philander et al., 2022; Philander, 2019; Welte et al., 2004).

The Czech Republic has one legal gambling machine per 182 inhabitants – the second highest number in the EU after Italy – and one of the highest densities of gambling machines in the population (Ziolkowski, 2020). Overall, 1,007 venues with legal gambling machines operated in the Czech Republic in 2021 (Mravčík et al., 2021), where 34,697 individual gambling machines were registered (MFCR, 2022). This is the result of a relatively liberal approach by the Czech government to general gambling regulation, which includes virtually no spatial regulation except the general prohibition of gambling in schools, medical care facilities, and churches. Apart from this general rules set by Act No. 186/2016, on gambling, the responsibility of regulating gambling – including spatial regulation – falls on the municipalities, which are the smallest self-governing administrative units in the Czech Republic. A municipality can restrict or even prohibit gambling in its area, allow gambling only in certain places or at certain hours. All municipalities have relatively autonomous competencies to regulate gambling within their administrative territory. The setting of such competencies differs in countries, such as Germany (Hofmann et al., 2022), Austria (Rapani & Kotanko, 2022), or Poland (Dynowski & Stelmachowski, 2022), where gambling is considered to be a matter of national regulation or regulation at the provincial, territorial, or state level. In the Czech Republic, there is no competence to regulate gambling on a district or regional level at all.

The liberal approach of the Czech regulation may also be apparent from the access of firms to the industry. According to Act No. 186/2016, a gambling venue can be run by anyone with a license. To obtain the license, the entrepreneur has to document his residence in the European Economic Area, minimum capital of 2 million EUR, transparent financing, and ownership. Overall, 51 companies did have a license to conduct gambling in the Czech Republic in 2021, all of which were private (Mravčík et al., 2021). The number of venues run by a single company is not limited.

However, in the past decades, there has been an apparent effort to eliminate gambling venues from highly populated areas. Detailed reasons differ from town to town, the most substantial pressures come from mayors (Fiedor, Šerý, et al., 2019) and from the general public both on the country and local levels (Fiedor, Král, et al., 2019). Among other

things, several anti-gambling initiatives were sound, i.e. Transparency International or Citizens Against Gambling programs. As a result, by 2021, 68 of 72 of the Czech district capitals, which are usually the local centers with the highest population in a district, introduced some gambling regulations. Seventeen of them imposed a total ban on gambling within their municipality, while others chose to regulate partially, which may take various forms of spatial limitations, e.g. providing a list of addresses where gambling is permitted, time limitations, or a combination of both (MFCR, 2022). Although the specific form of regulation differs, the number of gambling machines generally decreases over time in district capitals, creating possibilities for spillovers.

A typical characteristic of Czech municipalities, including district capitals, is their small size, the second smallest on average among the EU countries, the only comparable countries are France and Slovakia (OECD, 2018). The average area of the district capitals in our dataset (including the large capital city of Prague) is 63 km^2, which is equivalent to a circle with a radius of 4.5 km. Indeed, other municipalities are even smaller, less than 12 km^2 on average (equivalent to a circle with a radius of fewer than 2 km). This means that for most of the citizens of the municipalities where gambling is banned, there is another municipality within the range of a few kilometers where playing hazardous games is potentially possible. The entrepreneur expelled from one municipality may try to find another place to continue to run his business at a close distance, creating spatial spillover. At the same time, surrounding municipalities are financially motivated to allow gambling in their jurisdiction. Apart from general motives, such as the impact on employment or economic performance (Geisler, 2021; Lim & Zhang, 2017), municipalities receive a portion of taxes that are paid from the permitted gambling revenue in their territory. In the Czech system of tax redistribution among municipalities, revenue from gambling may play a more important role in the budget of a small municipality than in a large or medium-sized city (Fiedor et al., 2017). This may lead to the emergence of new gambling venues close to the district borders of the capital in a neighboring municipality, especially if the main negative socio-economic externalities are expected to stay in a gambler's domicile municipality, e.g. in a district capital, where he lives and works. Indeed, small municipalities may ban gambling as well as larger towns; nevertheless, according to data, only a small portion of them does so, compared to district capitals (MFCR, 2022).

Where there are no regulations, gambling availability and its proximity in places with a high population density may generate a higher frequency of problem gambling (Pérez et al., 2021). Thus, it is usually a highly populated district capital that introduces restrictive measures limiting gambling in its area. One might then raise the question of whether the regulations of the district capitals are able to reduce the gambling problem considering the possible mobility of gamblers and the situation of small regulatory units. In other words, we ask to what extent the local reduction of gambling is effective in the overall reduction of gambling in the area or whether the gambling activity only spills over the border of the municipality.

2. Data and methods

In the Czech Republic, a set percentage of total tax revenue on gambling machines is considered an income of the municipality where the machine is installed and used. Tax

rates and other parameters are valid for the whole country, and there are no differences among regions. Municipalities have no instruments to change applicable tax rates at the local level. Thus, the only way to influence the revenue from the tax on gambling machines is to regulate the number of machines in the municipality. Using the revenue from the tax on gambling machines in our dataset enables us to estimate the level of proliferation of the gambling machines in the examined territories using taxation data.

We used the data from the Ministry of Finance, which publishes quarterly data on the distribution of tax revenue at the municipal level (the percentage of the total tax on gambling machines revenue is distributed to each municipality, $n = 6{,}254$). Available data span from 2017 Q1 to 2021 Q4, 20 quarters in total. Although the data spans through several COVID-19 lockdown periods, there were no regional differences in epidemic rules imposed on this type of industry. This means that although the lockdowns did affect the industry as a whole (as the casinos were closed in some periods), they did not affect the spatial distribution of gambling around the country. All gaming facilities in the Czech Republic had to comply with identical rules and restrictions.

To study the intensity of gambling in a respective municipality, we use a relative share of the gambling machine tax revenue on the total gambling machine tax revenue of the whole country. Indeed, as large cities earn larger tax shares than small villages (Fiedor et al., 2017), values are divided by the share of the respective city in the total country population to accommodate the differences in size and a potential number of players. Thus, the indicator that we call gambling measure $GM_{i,t}$ used in the following analyses may be written as:

$$GM_{i,t} = \frac{\frac{revenues_{i,t}}{revenues_t}}{\frac{population_{i,t}}{population_t}} \times 100 \tag{1}$$

where $revenues_{i,t}$ are revenues of the respective municipality i in time t, $revenues_t$ are total revenues of the whole country in time t, $population_{i,t}$ is the population of the respective municipality i in time t, and $population_t$ is the total population of the whole country in time t.

An important factor determining the spatial spillover effect is the distance (Welte et al., 2004). We estimated the car travel distances and time durations between centers of municipalities using Open Source Routing Machine (OSRM) (Huber & Rust, 2016) on OpenStreetMap's data obtained on 7.1.2022 (Geofabrik, 2022). Coordinates of the municipalities were obtained from Github (Github/33bcdd, 2014). Due to the limited data availability, the travel time and distances are fixed throughout the time in our dataset. On the other hand, changes in the road network are not rapid enough to have any significant impact on the results in the 5-year time frame that we used. Demographic factors and other municipality statistics were obtained from the Czech Statistical Office (CZSO, 2021). Demographic data for 2021 were not available at the time of writing this paper, thus data for the previous year are used in the estimations. All the analyses were performed using Stata version 17.0.

Municipalities were aggregated into 76 administrative districts, but some adjustments had to be made to the original division. One district is equal to the single city of Brno, therefore no spillover could be observed by its nature – this district (*Brno-město*) was merged with its surrounding district (*Brno-venkov*) for the purpose of the analyses. The

capital city of Prague has a separate legal status and was not directly included for the same reason. On the other hand, Prague serves as a district capital for neighboring districts (*Praha-východ* and *Praha-západ*), meaning that potential spillovers from all cities are recorded in the dataset. The districts and their capitals were chosen for the analysis due to their historical administrative and economic significance, but also because the road network is historically designed to connect the more important district capitals than other municipalities.

The analysis excludes 138 municipalities directly bordering Germany and Austria, which are not district capitals. A significant proportion of the gambling industry is located here, accounting for 13% of tax revenue on gambling machines from only 2% of the total population. The same effect cannot be seen in municipalities bordering Poland and Slovakia; thus, such cases are left in the analyses. Nevertheless, the gambling industry located here relies on different types of customers, creating a separate problem of cross-border gambling tourism, which is out of the scope of our research. The inclusion of this specific type of gambling industry may significantly distort the results.

After the restrictions described above, we used the data of 6,116 municipalities out of which 72 are district capitals and 6,044 surrounding villages not bordering Austria and Germany in a time span of 2017 Q1 and 2021 Q4. Descriptive statistics are reported in Table 1.

To demonstrate the expected spatial spillover effect from the local center to the surrounding areas, we estimate a share of total tax revenue on gambling machines ($GM_{i,t}$ as described in equation (1)) of the respective municipality as a function of the share of total tax revenues on gambling machines in the district capital.

Using the OLS method, the following equation was estimated:

$$GM_{i,t} = \alpha + \beta_1 GM_{DC_{i,t}} + \beta_2 distDC_i + \sum_{n=3}^{5} \beta_n control_{n,i,t} + \theta_t + \in_{i,t} \quad (2)$$

Where α is a constant, β_1- β_n are parameters of the equation, $GM_{DC_{i,t}}$ is a share of revenues as described in equation (1)) in a district capital relevant to the municipality i in time t and $distDC_i$ are measures of distances (namely car travel duration, car travel distance, and air distance) from the respective municipality to the district capital. A set of n control variables describing other characteristics of the municipality $control_{n,i,t}$ was used in some model specifications. Specifically, inspired by the literature, we used the unemployment rate of the respective municipality as a measure of social conditions in the municipality, and a share of agricultural land on the total area of the municipality as

Table 1. Descriptive statistics. Note: DC means the District capital.

	mean	min	Max	sd
Tax shares ($GM_{i,t}$)	29.8	0.0	31259	438.8
Tax shares DC ($GM_{DC_{i,t}}$)	216.2	0.0	782.0	160.5
Car duration to DC (min)	20.1	1.2	58.2	9.2
Car distance to DC (km)	19.9	0.9	59.7	9.9
Air distance to DC (km)	15.2	0.3	43.2	7.5
District on borders (dummy)	0.3	0.0	1.0	0.5
Unemployment rate (%)	3.2	0.0	30.6	2.1
Share of agricultural land (%)	61.9	0.6	94.4	19.2
Observations	120866			

a measure of whether the area is a predominantly agricultural region. A higher share of agricultural land is typical for internal peripheries with a lower density of the population, and there was a higher proportion of older people aged 65 and over and a lower representation of younger people (Musil & Müller, 2008). Therefore, an internal periphery is expected to have fewer potential gamblers, and a location away from backbone communication (Fiedor et al., 2017). We also tested a dummy for peripheral districts (districts with at least one municipality bordering another country, which is 36.5% of regions) (D. A. Abbott & Cramer, 1993; Felsenstein & Freeman, 2002). Time fixed effects θ_t are employed to compensate for country-wide changes that affect all the units comparably. Such effects include changes in the legal environment or lockdowns in recent periods and $\in_{i,t}$ is the error term.

3. Results

In accordance with the literature, the reduction of gambling in a local center reduces overall gambling in the area. On average, according to our estimates, one percentage point change in gambling measure ($GM_{i,t}$) in the district capital results in a 0.246 reduction in the whole respective district *($n = 1440$, $p = 0.000$)*. However, a by-product of regulation is a spatial spillover effect that tends to increase gambling proliferation in surrounding municipalities. The main effect can be seen in Table 2, where the tax shares of the municipality (as defined in equation (1)) are estimated using the same indicator belonging to the district capital. The parameter of $GM_{DC_{i,t}}$ is negative for all model specifications and remains highly significant. This basic result shows that for every unit of decline in the tax share measure, the same indicator rises in the surrounding municipalities by approximately 0.1 unit on average, which shows the spatial spillover. Three measures of distance – direct air distance, car travel distance, and car travel duration – are employed in the regression to show the effect of growing distance. In all specifications, the effect is negative. Thus, further distance from the district capital negatively affects revenues from gambling and shows some gravitational effect pointing to the center of each district (Philander et al., 2022; Philander, 2019; Welte et al., 2004).

Table 2. Regression results describing the basic model (1) and three extended models using different measures of distance: air distance (2), car distance (3), and car duration (4).

	Gambling measure ($GM_{i,t}$)			
	(1)	(2)	(3)	(4)
Gambling measure DC ($GM_{DC_{i,t}}$)	−0.100***	−0.104***	−0.103***	−0.106***
	(0.000)	(0.000)	(0.000)	(0.000)
Air distance to DC (km)		−1.061***		
		(0.000)		
Car distance to DC (km)			−0.591**	
			(0.007)	
Car duration to DC (min)				−1.324***
				(0.000)
Constant	52.436***	69.472***	64.790***	80.366***
	(0.000)	(0.000)	(0.000)	(0.000)
Time FE	Yes	Yes	Yes	Yes
N	120880	120880	120880	120880
R2	0.0014	0.0017	0.0015	0.0021

Robust standard errors; p-values in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.005$.

Results using different distance measures are very similar (the three measures are highly correlated indeed); thus, only one – traveling time by car – will be reported in the following analyses.

The magnitude of the spatial spillover effect is further analyzed in Table 3, where we divide the dataset into several groups according to the time necessary to reach a district capital by car. Column 1 shows the parameters for the municipalities closest to the center, within a 10-min range. The parameter β_1 is negative, significant, and lies in the interval $< -1; 0 >$, confirming the presence of a partial spatial spillover effect. The increase in the gambling measure in surrounding municipalities is lower than the decrease in the gambling measure in a district capital, which implies a reduction and a partial spatial spillover. The parameter of the regression is much higher at close distances, reaching 0.451 with a negative sign, meaning that, on average, the share on tax revenues (GM) in surrounding municipalities rises by 0.451 for every unit of its decline in a district capital. The parameters decline quickly with growing distance, implying that only a narrow circle around the district is affected by spillovers.

The higher absolute value of the parameter in a longer distance (above 30 min; model 6) was not expected but can be observed with the use of any distance measure. Our possible explanation is that many peripheral municipalities in our district may be dependent on another town or even another district capital. The regulation of gambling in district capitals tends to allow for some regional similarities, as cities have to face similar, regionally dependent problems. Thus, we expect this result to be an artifact of uneven district capital distribution.

To test the robustness of the results, we further examined whether the results remain stable after controlling for other determinants of gambling prevalence used in the literature. Namely, we used the unemployment rate of the respective municipality, the share of agricultural land on the total area of the municipality, and a dummy for peripheral districts that border another country (D. A. Abbott & Cramer, 1993; Felsenstein & Freeman, 2002).

The results can be found in Table 4. The sign, size, and significance of the spillover variable remain robust and stable with the set of control variables employed with only slightly declining absolute values of coefficients. The coefficients of control variables proved to be significant in the model. The values of the gambling measure tend to be

Table 3. Regression results describing the results of the extended model with car travel distances. The first model (1) examines the closest municipalities to the district capital within a 10-min range, and other models (2, 3, and 4) are examining longer distances in 10-min intervals.

	(1)	(2)	(3)	(4)	(5)	(6)
Gambling measure DC ($GM_{DC_{i,t}}$)	−0.451***	−0.035***	−0.027**	−0.145***	−0.105***	−0.104***
	(0.000)	(0.000)	(0.007)	(0.000)	(0.000)	(0.001)
Car duration to DC (min)	−21.288***	−0.770***	−2.618***	−5.551***	−2.362***	−1.716*
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.015)
Constant	325.744***	44.688***	93.567***	140.282***	94.569***	114.128**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.003)
Travel time	<10 min	10–20 min	20–30 min	<20 min	<30 min	>30 min
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
N	16040	49220	37340	65260	102680	18160
R^2	0.0086	0.0016	0.0012	0.0048	0.0031	0.0014

Robust standard errors; p-values in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.005$.

Table 4. Results of full models that include a set of control variables: unemployment rate, dummy for border districts and share of agricultural land. Two sets of estimations are shown; models 1–3 are calculated within a 10-min range around the district capital and models 4–6 are estimated on the full dataset.

	Gambling measure ($GM_{i,t}$)					
	(1)	(2)	(3)	(4)	(5)	(6)
Gambling measure DC ($GM_{DC_{i,t}}$)	−0.439***	−0.418***	−0.393***	−0.103***	−0.102***	−0.095***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Car duration to DC (min)	−21.390***	−21.567***	−22.217***	−1.245***	−1.222***	−1.363***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Unemployment rate (%)	−11.103**	−13.447***	−16.287***	−2.214***	−2.649***	−2.810***
	(0.002)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
District on borders (dummy)		100.110***	59.107***		16.314***	9.587***
		(0.000)	(0.000)		(0.000)	(0.001)
Share of agricultural land (%)			−3.251***			−0.837***
			(0.000)			(0.000)
Constant	359.16***	323.05***	556.72***	86.20***	81.41***	137.50***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Travel time	<10 min	<10 min	<10 min	All	All	All
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
N	16040	16040	16040	120880	120880	120880
R2	0.0090	0.0118	0.0157	0.0022	0.0025	0.0038

Robust standard errors; p-values in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.005$.

higher in areas with lower unemployment rates and also higher in districts that are close to borders. Negative signs in the last variable and the share of agricultural land in the municipality indicate that rural areas tend to achieve lower values of gambling measures than urban areas.

4. Discussion

This study points out that the mobility of the gambling issue, which is especially relevant under the circumstances of small regulatory areas, reduces the possibilities of spatial regulation. This is the case of the Czech Republic, where the responsibility to exterminate or reduce gambling activity falls on small municipalities that are, on average, among the smallest in the EU. According to our results based on the revenue from taxes imposed on the gambling machines, regulation of gambling in larger towns (district capitals) produces a significant shift of gambling activities to surrounding municipalities. Movement of the gambling venue closely behind the district capitals' borders to a place that is quickly accessible reduces exposure to gambling in a limited way. Such persistence of gambling issues is in line with previous findings (M. W. Abbott et al., 2016; Papineau et al., 2020; Philander, 2019; Shaffer et al., 2004) that participation in gambling increases with higher availability of casinos and gambling products. In general, municipalities are financially motivated to accept gambling venues (Fiedor et al., 2017) but the final decision of a local government is usually dependent on many factors that differ among municipalities. These may include moral motives (Toossi & Zhang, 2019), the personal experience of the mayor and other members of the municipal council, the size of the municipality (Fiedor, Šerý, et al., 2019), or the public opinion of the community (Fiedor, Král, et al., 2019).

From a spatial perspective, our study estimates the highest spatial spillover effect exists in a circle of a 10-min ride by car from the center of the district capital where gambling is regulated or even banned. In this instance, the measure of gambling (which is a population-weighted share of gambling machine tax revenue) rose by a 0.451-percentage point for every percentage point of the drop of the same measure in the district capital. Nevertheless, in municipalities that are more than 10 min of the district capital, the spatial spillover effect is close to zero, implying that most of the spillage takes place within a very close distance. Such a finding is complementary to other estimations that the problem of gambling is positively related to the presence of a casino within 10 miles from the home of the survey respondents (Welte et al., 2004). Similarly, people living 700 m from casinos, gambling centers, or betting shops have twice the probability of becoming a problem or pathological gamblers than residents living further than 3 km away (Pearce et al., 2008). This questions the reasonability of the fragmented regulation in very small local units as the movement of gambling venues right behind the border of a municipality may not change the gamblers' perception of gambling availability (Ofori Dei et al., 2020). Contrary to the disintegrated approach examined in the paper, some other countries prefer to regulate gambling on a governmental level with state restrictions. For example, the high efficiency of state restrictions on the availability of EGM gambling exists in Norway. Norwegian policy restrictions conducted between 2006 and 2009 led to significant declines in gambling turnovers and overall gambling (Rossow & Hansen, 2016). On the other hand, attitudes toward gambling regulation may be stronger on a local level than on a government level (Eadington, 2003). In the case of the Czech Republic, negative attitudes toward gambling on a local level are even more pronounced than in many other countries (Fiedor, Král, et al., 2019). This may lead to overall stronger regulation than in a case where the regulatory power was mostly laid on the general government.

In addition to the main spatial spillover effects, other variables possibly predicting gambling proliferation in municipalities were tested. Nevertheless, it is important to note that only municipalities that are not district capitals were included in the model as data on district capitals were used as an explanatory variable. Thus, the result is biased toward non-district capital municipalities rather than toward the general situation. The division into districts is historical, the contemporary administrative division into 14 regions (NUTS3) was tested, but this specification did not provide stable and robust results. We expect that this is due to their size – our results suggest that the spatial spillover can be observed only in close surroundings around the district capital. NUTS3 regions are probably too large to induce such a measurable effect because the majority of the spillover occurs in the area that is much closer to the size of the LAU1 district than the NUTS3 region.

The negative sign in the unemployment measure may seem counterintuitive and in contradiction with other studies (Hahmann et al., 2021; M. W. Abbott et al., 2016), but the result is due to the spatial distribution of gambling venues that are mostly concentrated close to major towns where the unemployment rates are also lower. Thus, the results do not demonstrate the socioeconomic status of gamblers but rather the spatial distribution of gambling availability and job availability, which is correlated. The share of agricultural land was tested significant and negative, which is expected as a higher share of agricultural land is typical for internal peripheries with a lower density of the

population and other differences in sociodemographic structures as in age structure (Musil & Müller, 2008). Therefore, an internal periphery is expected to have fewer potential gamblers, and a location further from important road connections.

5. Conclusions

Spatial regulation of gambling machines in the Czech Republic is based on the decision-making of the municipal authorities in small local area units that are of similar size to France and Slovakia. This allows restricted gambling to easily move to close municipalities where the regulations are less strict. In the research of possible spatial spillovers from district capitals to nearby municipalities, we found that for every unit of the decline of the gambling measure, the same measure rises by 0.45 in a 10-min travel range from the center of the district capital. This implies that quite strong spatial spillover is present in local regulation, but only a narrow circle around the capital is significantly affected. There is partial spatial spillover, implying that the spatial regulation of gambling machines reduces the overall proliferation. However, small regulatory units are not very effective in preventing gamblers to search for gambling machines nearby. Thus, aside from a variety of all the possible motives to regulate gambling in specific areas, which could include public health, criminality, and many other sociodemographic issues, policy makers should also consider spatial limits of gambling regulation on the local level.

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Data availability statement

The data that support the findings of this study are openly available in Mendeley Data at http://doi.org/10.17632/fxcdxs7w4b.1

Statement of Ethics

The research used publicly available data, and no experiments on human participants or animals were conducted.

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