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Institutions versus location of new firms: does distance matter? Evidence from the Polish economy

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ABSTRACT

The research aim was to identify the effects of the institutional environment-supporting business activity on new firms' location. Using a series of negative binomial models, coupled with Hausman-Taylor estimations and Granger causality tests we studied the role of quality of institutions and distances to various types of institutions on the spatial distribution of new firms. The analysis also takes into consideration other location criteria, arising from the geographical location and socio-economic conditions in Poland's smallest administrative division unit, i.e., a municipality. The results revealed a positive role in the quality of institutions as firms' location criteria. Furthermore, the distance of firms to different institutions tended to be significant, albeit depending on these institutions' type. In this regard, the distance of numerous local institutions performing a broader spectrum of activities was a significant location criterion, while the distance to institutions focusing on a narrow range of activities (e.g., supporting innovations, R&D), dedicated to selected or supra-regional groups of clients, more frequently proved to be insignificant. Implications arising from the research can help local authorities, which take measures to improve the institutional environment supporting firms.

1. Introduction

Institutions are of crucial importance to the understanding of mutual relations between policy and economy or consequences of these relations for economic growth (i.e., stagnation or recession) (Arrow, 1969; Coase, 1937; North, 1994, 2002; Rodríguez-Pose, 2013; Williamson, 1979). In the 1990s, studies on the role of institutions focused on the determination of the institutions' contribution to levels of revenues earned worldwide, and their impact on economic growth (Acemoglu, 2008; Álvarez-Díaz & Caballero, 2008; Hall & Jones 1996; Kaufmann et al., 2003; Kraay et al., 1999; Rodrik, 1999, 2003; Rodrik et al., 2002; Woolcock & Narayan, 2000). It

was shown that institutions operating ineffectively had a negative influence on capital flows and investors' trust, generating poor economic results achieved by national economies (Alfaro et al., 2008). Institutions also affect the development of entrepreneurship, as they can lower transaction costs (Arrow, 1969; North, 2002; Williamson, 1979) and ensure proper conditions for the development of business and stimulation of entrepreneurship (Baumol et al., 2007; North, 2002).

The role of institutions in the development of entrepreneurship on the national, regional and local levels has been broadly discussed in the literature over the past 30 years (Baumol, 1990; Fuentelsaz et al., 2015; Holmes et al., 2013; North, 2002; Rodríguez-Pose, 2013; Williamson, 2000). It is commonly believed that well-operating national institutions are pivotal to the development of entrepreneurship, which in turn is one of the key determinants of economic growth (Audretsch, 2001; Baumol, 1990; Williams & Vorley, 2015). However, there is relatively less research on the efficiency of institutions (Chousa et al., 2005; Putnam et al., 1995).

Nevertheless, high quality of institutions is essential for gaining location benefits, and institutional solutions are needed for making decisions about the internalisation of production (Williams, 1997). There is very less research and thus publications showing the role of particular institutions in location decisions made by firms.

This study aims to filling this gap by identifying the effects of the quality of the institutions and the distance from particular types of institutions (supporting business activity) on new firm's location. A peculiar novelty is considering this research problem at the local level with the use of the proposed variables signalling (among other factors) the importance of distance to particular types of institutions. With the use of a series of negative binomial models and Hausman-Taylor estimations, assessed on the level of municipalities (LAU 2) in Poland, in 2010–2017, we point to the role of quality of institutions as well as the distance of various types of institutions as a potential new firms' location factor. In this context, it is not merely the overall quality of institutions that matters, but first and foremost, it is the role which every institution plays in locating a new firm and the distance from such institutions. The range of impact can be limited, or the scale of their influence on the local economy can diminish as the distance from these institutions increases. Last, not all institutions may matter equally in a new firm creation. Thus, we test a hypothesis according to which: closer distance to particular business environment institutions determines higher new firm creation in a municipality. This paper presents the effects of closeness to institutional business support affecting the spatial location of new firms.

The results confirmed the influence of the quality of institutions on locating new businesses, however, according to a Granger-causality test the relation was bidirectional. The role of a distance to various institutions depended on the type of analysed institutions and the range of their influence (more numerous, local institutions were more important than national and less numerous ones). In certain cases of institutions, a shorter distance to an institution was a significant factor in the location of new firms. Thus, efficient institutional support offered to entrepreneurs is beneficial to the economic activities they carry out. This gives rise to significant implications for local development, having much importance for the quality of local or regional institutions in the development of entrepreneurship. It may also signal the

diminishing effects or spatial boundaries of the policy realised by local institutions, supporting business activity.

The remainder of the paper is split into four sections: section one describes the theoretical foundations for the role of institutions, as well as institutional quality, governance or institutional efficiency on firms' location. Section two contains detailed information of the datasets obtained, methodological issues and the applied empirical strategy. Section three presents the empirical findings and discusses the results. The last section concludes the paper and specifies implications for regional policy.

2. Role of institutions in creating entrepreneurship on a local level

Location of firms is explained by the classical theory of location initiated by J.H. Thünen (1826). Classical theories of location are mainly based on minimising costs and maximising profits by firms (Dube et al., 2016). Contemporary theories of location arise from the classical approach, including the notion of business environment institutions. Initially, studies into the location of firms tended to neglect the role of institutions in this area, as it was perceived to be relatively unimportant. The concentration of business activities and agglomerations were explained through an analysis of market mechanisms, allocation of resources, the scale of benefits, etc. (Aroca & Atienza, 2016; Yiu & Makino, 2002). However, historical developments, the presence of institutions and implemented policies led to a situation where the awareness of a crucial role of institutions in the economy increased. Most of such articles address the issue of expansion into foreign markets in the form of direct foreign investments (Ali et al., 2010; Çevis & Çamurdan, 2007; Nyuur et al., 2016; Sabir et al., 2019).

The research conducted by Zajkowski and Domańska (2019) showed that BEIs have a positive impact on decisions to set up a new firm. There is a growing body of investigations into the relationship between institutions and entrepreneurship (Godlewska & Morawska, 2020). Researchers focus on: (i) effect of institutions on the entrepreneurship rate or type, (ii) institutional barriers, (iii) effect of entrepreneurship on institutional changes, (iv) institutional asymmetry, (v) effect of the institutional environment on productive, unproductive or destructive entrepreneurship (Audretsch et al., 2006; Bazo et al., 2019; Boudreaux & Nikolaev, 2019; Estrin & Mickiewicz, 2010; Godlewska, 2019; Lubacha-Sember & Godlewska, 2018; Williams & Vorley, 2015; Williams et al., 2017). The studies conducted to date have led to the conclusion that institutional support has a decisive influence on the entrepreneurial activity (Baumol, 1990; Minniti & Lévesque, 2008; Shane, 2009; Williams et al., 2017; Williams & Shahid, 2016).

According to the assumptions underlying the theory of entrepreneurship, institutions affect: (i) entrepreneurial attitudes (Estrin & Mickiewicz, 2010; North 1994), (ii) types of businesses entrepreneurial individuals undertake (Minniti & Lévesque, 2008), (iii) quality of business activity (Baumol, 1990), (iv) level of entrepreneurship (Acs et al., 2008), (v) a drive towards achieving wealth by facilitating entrepreneurial activities (Holcombe, 2015). According to Fuentelsaz et al. (2015), the role of institutions is essential in the elimination of imperfections on the market and the creation of conditions conducive to the growth of entrepreneurship. Owing to work done by

institutions, firms can operate without having to bear excessive risk or costs (Meyer et al., 2009; North, 2002; White et al., 2019).

As stated in Acemoglu et al. (2005), differences in location, such as geographical location, climate, area of a given territory, have some influence on the decisions made by firm managers. The observation falls into the findings of Audretsch and Belitski (2017) who noticed that not only the local context matters but also more comprehensive regional one in the development of entrepreneurship in cities. Particularly, Audretsch et al. (2012) pointed out that location matters in a new firm creation as the highest propensity to start new businesses is in the industrial areas, city agglomeration and city suburbs.

However, the choice of location for a firm also depends on its institutional environment. This dependence arises from the functioning (or not) of an institution in the area chosen by an entrepreneur, but also from the range of impact of this institution on firms and on other institutions – the influence of institutional environment is felt most intensely by firms which lie near the institutions (Markiewicz, 2010). This observation agrees with Tobler's first law of geography (1970): 'everything is related to everything else, but near things are more related than distant things'.

In turn, a study completed by Godlewska and Morawska (2020) on measures taken by Polish local and regional formal institutions to support the development of local and regional entrepreneurship suggests that the geographical location, political power, level of unemployment, size of the territory or level of debt did not influence the behaviour of local governments in terms of the support they offered to entrepreneurs. The model of management, type of institution and number of firms within the range of impact of an institution were significant according to representatives of regional formal institutions.

Location of firms and the role of institutions has been the subject of empirical studies. There is a growing interest in recognition of formal institutions as well as 'soft' location factors like social capital or entrepreneurial culture on the location of firms/new firm creation (Fritsch & Storey, 2014).

Yet, scientific research concerning the impact of distance on the location of firms is a relatively new direction in studies. Research into global strategies of the supply of American importers has shown that the quality of the institutional environment in exporter countries can affect the spatial concentration of industrial activity. Based on the research results, Kamal and Sundaram (2019) concluded that weak institutions in exporting countries were linked to a higher concentration of firms supplying American importers. Whereas, the efficiency of an institution is connected with good governance, which means an increase in the quality of activities performed by public institutions and improved potential of public administration. According to the research results provided by Wilkin, (2013), implementation of principles of good governance[1] is an essential condition for the further dynamic growth of Poland on all levels of its administrative division. Research into the role of institutions in processes of economic development and state transformation, particularly in Central and Eastern Europe, has also provided important findings (Marks-Bielska, 2014), as the quality of institutions affected long-term paces of growth/trajectories of CEE countries during their transition period.

Ketterer and Rodríguez-Pose (2018) compared the effect of institutions and factors of the first nature of geography (e.g., availability of resources, land relief, climate) on

economic growth. The results showed that regional institutional conditions (efficient local governments, effective fight against corruption, etc.) were more important than geographical conditions on the regional level.

Also, the quality of institutions can affect the spatial concentration of industries (Kamal & Sundaram, 2019), and the distance between territorial government units and capital cities of regions (NUTS 2) affects the socio-economic development on both the local and regional levels in Poland (Kopczewska, 2013). The latter is due to geographical distance which restrains the economic policy transmission. Another thread in the research joins increased distance from state capital cities in the USA with high corruption, affecting the sectoral firm concentration (Boudreaux et al., 2018).

The literature lacks research dealing with detailed econometric analyses of the range of impact by business environment institutions (BEI) on new firms, especially on the local level. A question arises whether the range of influence by BEI can affect the spatial concentration of new firm creation. Hence, the hypothesis was put forth:

> Hypothesis 1: Closer distance to particular business environment institutions determines higher new firm creation in a municipality.

3. Research methodology

3.1. Dataset

We utilise a dataset obtained from a series of sources. Data on the operation of new firms at a local level of data aggregation (municipality, LAU 2, *pl gmina*) together with some socio-economic statistics come from Statistics Poland (GUS). Sadly, the range of available variables at the municipality level from this source is strongly limited, and in some cases, the publication date is delayed. The Energy Regulatory Office provided data on the percentage of households with access to the Internet at the bandwidth of at least 30 Mb/s in municipalities. These data are only available for cross-section, as the time-dimension is not yet available.

Geographical information on the minimum distances (in km) between various types of institutions and centres of municipalities were calculated from maps with the use of QGIS software, based on GPS coordinates of every institution, which were subsequently grouped into particular types of institutions. Table 1 presents types of local/regional institutions operating in Poland in 2017, with their corresponding number of entities, used in the calculation of distances. Besides their quantity, one may also find the scope of their operation. It is worth adding here that the support of entrepreneurship in Poland is implemented in a decentralised way – practically all institutions can somehow affect the operation of firms at the local level.

Due to the high correlation of distances to RDA, MO, and PO with the location of regional capital cities, they were removed from the final study as this could lead to the inclusion of agglomeration externalities rather than the effects of their operation *per se*. As relative location can also affect new firms' location, the dataset comprises information on the minimum proximity of municipalities to different means of transportation (i.e., national road, railway station, airport) and regional capital cities, obtained through calculations on maps.

Table 1. Types of institutions incorporated in the study together with their scope of operation.

| Abbrev | Institution Name | Freq. | Scope | | | Local/regional government |
			National	Regional	Local	
DAO	District Authority Office	314		x	x	x
LF	Loan Fund	165	x	x	x	
TAC	Teaching and Advisory Centre	123		x	x	
TTC	Technology Transfer Centre	73		x	x	
AI	Academic Incubator	42		x	x	
RDA	Regional Development Agency	36		x	x	
STP	Science and Technology Park	33	x	x	x	
IAC	Investor Assistance Centre	16		x	x	x*
MO	Marshal's Office	16		x	x	x
PO	Provincial Office	16		x	x	x
SEZ	Special Economic Zones headquarters	14	x	x	x	
TI	Technology Incubator	10	x	x	x	
BA	Business Angel	9	x	x	x	

Source: own elaboration. Note: * supervised by MO.

Finally, we merged the dataset with the European Quality of Government Index designed by Charron et al. (2019) for 2017, Charron et al. (2015) for 2013, and Charron et al. (2014) for 2010. Knowing its limitations, resulting from a higher level of data aggregation than in this study, we incorporated the index into the estimations to proxy the quality of institutions (formal and informal) to reveal their role in the process of locating firms. We believe that the omission of this index could lead to unnecessary bias as the quality of the institution differs substantially across time and regions. Because the index is calculated for specific years only, the remaining in-between observations were interpolated[2] to cover the whole length of the study period. Thus, the final duration of the research ranges from 2010 to 2017, embracing about 20k observations. Because the number of municipalities changed during that period, while some had their type/code altered, we had to transform the dataset to the latest administrative division with a total of 2478 municipalities. Table 2 presents variables employed in the study together with the information on the sources of the data.

Due to high correlations among some descriptives depicting the location of particular institutions, resulting from their proximate location, a small number of variables were excluded from the final dataset. This necessitated the removal of distances to the Marshal's Offices, Provincial Offices, Investor Assistance Centres, usually seated in the same city (sometimes located within a few hundred metres), potentially intercepting the role of the distance from the regional capital city. To grasp heterogeneity in the role of particular institutions and to avoid any unnecessary correlation among them (see Table A1 in the online appendix), we include institutions into the models separately and compare the magnitude and significance of variables.

As for special economic zones, it was more appropriate to calculate distances to particular subzones of SEZs rather than to their headquarters, usually located in regional capital cities. The reason was the fact that SEZs are part of a place-based policy; thus their influence is limited to the territories to which public policy aid is addressed (and occasionally to their neighbourhood). A detailed correlation matrix with descriptives is available in the online appendix in Table A2, together with VIF (Table A3) and GINI (Table A5) estimates.

Table 2. Descriptive statistics used in econometric modelling.

Variables	Description	Source	(1) N	(2) mean	(3) sd	(4) min	(5) max
dist_droad	Distance to the nearest domestic road [km]	GIS	19,824	7.98	6.14	0.05	39.93
dist_rails	Distance to the nearest railway station [km]	GIS	19,824	9.34	6.89	0.08	36.69
dist_SEZ	Distance to the nearest SEZ subzone [km]	GIS	19,824	16.39	11.47	0.11	84.77
dist_airp	Distance to the nearest airport [km]	GIS	19,824	82.99	50.8	1.45	298.8
dist_cap_c	Distance to the nearest regional capital city [km]	GIS	19,824	54.74	25.26	0.28	148.8
dist_BA	Distance to the nearest Business Angel [km]	GIS	19,824	106.79	60.45	0.97	297.8
dist_TTC	Distance to the nearest Technology Transfer Centre [km]	GIS	19,824	28.69	17.11	0.07	116
dist_LF	Distance to the nearest Loan Fund [km]	GIS	19,824	31.31	18.72	0.15	116.4
dist_AI	Distance to the nearest Academic Incubator [km]	GIS	19,824	53.75	30.78	0.22	155.1
dist_TI	Distance to the nearest Technology Incubator [km]	GIS	19,824	108.7	66.84	0.68	305.3
dist_TAC	Distance to the nearest Teaching and Advisory Centre [km]	GIS	19,824	28.68	17.1	0.07	116
dist_STP	Distance to the nearest Science and Technology Park [km]	GIS	19,824	78.64	42.06	0.07	209.2
dist_DAO	Distance to the nearest District Authority Office [km]	GIS	19,824	12.48	7.033	0.06	41.86
inst_qual	European Quality of Government Index (normalised)	QoG	19,824	39.82	2.96	34.48	47.09
internet	The percentage of households with access to the Internet of at least 30 Mb/s bandwidth	ERO	19,824	42.39	24.21	0.51	98.91
ln_pop_95	Ln population in a commune in 1995	GUS	19,824	9.08	0.808	5.91	14.30
sh_pop_water	Share of population with access to drinking water	GUS	19,824	83.79	18.62	0.2	100
new_firms	The number of new firms in a municipality	GUS	19,824	137.86	707.63	1	32565

Source: developed by the authors. GIS – calculations on maps, GUS – Statistics Poland (GUS), QOG – The QoG Institute, Sweden, REO – The Regulatory Energy Office.

3.2. Econometric strategy

Due to the character of data, the number of possible econometric approaches is limited. The lack of time-variation of geographical variables, representing distances to different points of interest (POI), and distances to transportation nodes, together with the character of explanatory variables, created certain constraints regarding econometric approaches. Thus, it was impossible to apply fixed-effects (FE) models or the dynamic panel econometric techniques. Due to the skewness of dependent variables, the applicability of the standard regression model was excluded as well, because it could lead to biased estimates.

Excessive zeros in the dependent variable are not an issue here, thus the use of zero-inflated models is unnecessary. However, in many studies on the location of economic agents or FDI, Poisson regression models or negative binomial models are employed (Grinza & Quatraro, 2019; Holl & Mariotti, 2018; Jiang et al., 2018; Nazarczuk et al., 2020; Nazarczuk & Krajewska, 2018; Sunny & Shu, 2019). The latter is more appropriate when overdispersion occurs in data, as is the case in the current study because they make it possible to relax the assumption that the expected value has to be equal to the variation.

In the process of identifying determinants of the location of new firms, the following equation was used:

$$new\_firms_{it} = \alpha_0 + \alpha_1 Z_i + \alpha_2 X_{it} + \alpha_3 dist\_INST(V)_i + \mu_t + \varepsilon_{it}$$

where, new_firms_{it} stands for the creation of new private establishments; i represents municipalities; t means subsequent years; Z_i is a matrix of time-invariant local characteristics; X_{it} represents the matrix of time-variant local characteristics, $dist\_INST_i$ stands for distances to institutions of V type, μ_t stands for time-fixed effects, whereas ε_{it} is an error term.

As endogeneity is a concern, we address the issue by introducing historical values (of the population)[3] similarly, as Fritsch and Wyrwich (2014) or Glaeser et al. (2015), which enables controlling the initial levels of the variable and eliminating the potentially arising problem of endogeneity. To control changes in the business cycle and other macroeconomic conditions, we applied year-fixed effects to capture any changes in the economic situation that changed throughout 2010–2017 and which might affect the number of firms. The significance of year-FE was verified and year dummies were significantly different from the null. The other versions of estimations, i.e., without year-FE effects applied, which yields similar results are available upon request.

To countercheck the validity of the obtained results, we also address the second econometric approach. As endogeneity may be a concern here – as proved by the Durbin-Wu-Hausman test of endogeneity (see Table A4 in the online appendix) – and a few of the important variables are time-invariant (FE/dynamic model would exclude them from the model), we utilize the Hausman-Taylor estimator to obtain more robust findings, thereof. In this regard, the following equation is used:

$$new\_firms_{it} = \alpha_0 + \alpha_1 X_{1ti} + \alpha_2 X_{2it} + \beta_1 Z_{1i} + \beta_2 Z_{2i} + u_i + v_{it}$$

where,

X_{1ti} – is a vector od exogenous, time-varying variables,

X_{2it} – is a vector of endogenous, time-varying variables,

Z_{1it} – is a vector of exogenous, time-invariant variables,

Z_{2it} – is a vector of endogenous, time-invariant variables.

The validity of model specifications was further verified with the Cragg-Donald robust CUE-based (LM version) test of overidentifying restrictions as well as underidentifying restrictions. Both tests are robust to heteroskedasticity and within-cluster

correlation and implemented in STATA by Schaffer and Windmeijer (2020). The former test verifies the validity of the set of instruments (H0 informs that the set of instruments is valid), whereas the latter test evaluates if the specification is having the problem of underidentification (H0).

Finally, to identify the direction of influence between institutional quality and new firm creation, we applied the Granger causality tests, following Dumitrescu and Hurlin (2012), which were implemented in STATA by Lopez and Weber (2017). The rejection of H0 means that X does Granger-cause Y in at least one panelvar. Since the number of time-periods is limited, we were unable to run other causality tests. Due to the time-invariant nature of the distance to particular institutions supporting a business activity, the Granger-causality tests could not be conducted in their cases either.

4. Results and discussion of findings

Table 3 presents the estimations of location criteria with the use of different sets of descriptives. In column 1 only geographical factors are used. They refer to (i) distances to different means of transportation, being a proxy of transport accessibility, and (ii) regional capital cities, which enable grasping agglomeration economies. We intently included the distance to railway stations instead of the distance to railway lines, as the latter are frequently correlated with distances to the main road grid, and their usability without a railway station is rather low. Apart from geographic-specific variables, historical values of the population are included. The results indicate the prime role of good transportation on a local level, together with closeness to major cities.

With technological progress and social development, the conditions for running business change. Enterprises are continually trying to respond to the contemporary consumer needs by creating new products and services. In their location decisions, contemporary industries take into account not only traditional location factors, but also modern ones like human capital, social capital, access to information or climate. Thus, we incorporate into column 2 of Table 3, factors like the share of households with access to the Internet as well as other more classical factors like access to water, which are positive and significant. Due to the unavailability of data at the municipality on level of education, wages, prices of land, etc. we have not included them into estimations.

Firms' location decisions may be also affected by the situation on a labour market and demographics, depicting the ease of finding potential employees. In column 3 of Table 3, we incorporate the statistics for municipalities. Generally, the areas with a higher share of the working-age population, have a better situation on the labour market and can attract or generate a higher number of new firms.

Column 4 appends the proxy of the quality of institutions, which positively affects the location of companies in municipalities. Its positive influence is also acknowledged in the fourth column, where we verify if the findings will remain similar once we change the estimator for Hausman-Taylor, which enables to better control for potential endogeneity in the model (see Table A3 in the online appendix).

Table 3. The role of institutional quality in the location of new firms.

Variables	(1)	(2)	(3)	(4)	(5)
Estimator	NB	NB	NB	NB	HT
dist_airp	−0.002***	−0.002***	−0.001***	−0.001***	−0.651**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.284)
dist_cap_c	−0.002***	−0.002***	−0.002***	−0.002***	−2.387***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.848)
dist_droad	−0.006***	−0.006***	−0.003***	−0.004***	−6.911***
	(0.001)	(0.001)	(0.001)	(0.001)	(1.406)
dist_rails	−0.012***	−0.011***	−0.007***	−0.007***	0.162
	(0.001)	(0.001)	(0.001)	(0.001)	(1.515)
ln_pop_95	1.054***	1.040***	1.056***	1.055***	
	(0.005)	(0.005)	(0.004)	(0.004)	
internet		0.001***	0.001***	0.001***	6.605***
		(0.000)	(0.000)	(0.000)	(1.585)
sh_pop_water		0.001	−0.001***	−0.001***	0.047
		(0.000)	(0.000)	(0.000)	(0.057)
sh_pop_prod			0.089***	0.088***	22.322***
			(0.003)	(0.004)	(3.055)
sh_unemp_prod			−0.020***	−0.020***	−1.574***
			(0.002)	(0.002)	(0.379)
inst_qual				0.007***	1.652***
				(0.002)	(0.434)
Constant	−4.894***	−4.884***	−10.433***	−10.646***	−1,366.975***
	(0.051)	(0.058)	(0.228)	(0.192)	(171.040)
Observations	19,824	19,824	19,824	19,824	19,824
Number of municipalities	2,478	2,478	2,478	2,478	2,478
Year FE	YES	YES	YES	YES	NO
Pseudo R2	0.200	0.201	0.214	0.214	
LogLik	−93146	−93086	−91522	−91500	
LR	71491	75118	100509	101897	
p	0.000	0.000	0.000	0.000	0.000
Alfa	0.178	0.177	0.151	0.151	
AIC	186320	186205	183080	183038	
BIC	186430	186331	183222	183188	
Wald chi2 (p-val)					401.51 (0.000)
Overid test (p-val)					0.183 (0.669)
Underid test (p-val)					111.3 (0.000)

Source: developed by the authors. Clustered standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Note: NB – negative binomial, HT – Hausman-Taylor. Overid-overidentification test. Underid– underidentification test.

The results of the Granger-causality tests acknowledged the bidirectional relationship among the quality of institutions and new firms in municipalities between 2009 and 2017 (Table 4). Therefore, the quality of institutions exerts a causal relationship on new firm creation, as well as there is reverse feedback from the new firm creation to the quality of institutions. Therefore, the assumption of its endogeneity (Table 3, column 4) seems to be grounded.

The external observation carried out during the implementation of previous research (Kisiel et al., 2011) concerning business environment institutions shows that the managers, understanding the role of these units in shaping entrepreneurship in a given area, try to improve the quality of the services by introducing innovations. These activities also contribute to an increase in the competitiveness of a given business environment institution in relation to others. Therefore, new enterprises in a given area contribute to the improvement of the quality of institutions operating there.

Notably, entrepreneurship requires strong formal institutions, well-enforced, stable, and precise regulations (Godlewska, 2019). Otherwise, the investment risk created by

Table 4. The Granger-causality tests.

	inst_qual -> new_firms	new_firms -> inst_qual
W-bar	3.0325	1.9487
Z-bar	71.5441 (p-value = 0.0000)	33.3923 (p-value = 0.0000)
Z-bar tilde	14.4233 (p-value = 0.0000)	2.9778 (p-value = 0.0029)

Source: developed by the authors. H0: X does not Granger-cause Y.

the (weak) institutional environment negatively affects the entrepreneurs' decisions about the firm location (Mariev & Davidson, 2018). Similarly to the above, the results obtained in the paper confirmed the necessity to create an institutional environment favourable to business as it translates to the new firm formation.

The institutional environment includes, among other things, protection of property rights, regulation of corruption or education quality. However, essential for the economic activity, as well as for the whole economy, is an efficiently and effectively functioning state and the law, known as formal institutions. The number and quality of regulations translates directly into motivation or the lack of it in the context of entrepreneurial behaviour, and thus affects the volume of output produced by the enterprise sector (Escandon et al., 2019; Verkhovskaya & Aleksandrova, 2018).

In countries (regions) with efficient institutions, entrepreneurs are more likely to engage in productive market entrepreneurship. However, in countries (regions) without strong institutions, the same entrepreneurs would be more prone to unproductive behaviour and manipulation (e.g., in political or legal trials) (Fuentelsaz et al., 2019; Knowles & Weatherson, 2006; Sobel, 2008). Whereas Popov et al. (2018) also proved that the normative institutional environment has a positive impact on the development of social entrepreneurship in developed countries.

A well-functioning institutional environment also influences the inflow of foreign direct investment. Research conducted by Borojo and Yushi (2020) confirmed that the improvement of the quality of the business and institutional environment of African countries stimulates the inflow of Chinese FDI to Africa. Additionally, Ascani et al. (2016), using data on 6888 greenfield investment projects, proved that the national institutional framework quality is beneficial for attracting foreign investment.

Apart from the quality of institutions, another factor potentially affecting the location of new firms might be the distance to different types of institutions. This assumption stems from the suggestion that geographical distance may weaken the transmission of economic policy (Kopczewska, 2013), including measures implemented by different types of formal institutions. In order to test whether this hypothesis would hold, we run a series of estimations with minimum distances to particular types of institutions. The distances are included separately in subsequent estimations (Table 5) to grasp the potentially heterogeneous impact of particular types of institutions.

The results presented in Table 5 indicate that not all of the distances to different types of institutions matter in the location of new firms, especially when other location criteria are incorporated into the study, together with a proxy of the quality of institutions. Usually, local and numerous (not regional or national) institutions more intensively focused on the functioning of a firm were more important in terms of their location. In this respect, the closeness to Loan Funds (LF), Teaching and

Table 5. Location of new firms and distance to different types of institutions.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Model	HT	HT	HT	HT	HT	HT	HT	HT	HT
dist_airp	−0.581**	−0.641**	−0.638**	−0.673**	−0.766**	−0.641**	−0.575**	−0.655**	−0.680**
	(0.264)	(0.280)	(0.281)	(0.302)	(0.349)	(0.280)	(0.241)	(0.278)	(0.287)
dist_cap_c	−2.098***	−2.143***	−1.966**	−2.569**	−2.110***	−2.143***	−2.538***	−2.378***	−2.170***
	(0.738)	(0.790)	(0.771)	(0.999)	(0.719)	(0.790)	(0.943)	(0.858)	(0.813)
dist_droad	−6.400***	−6.584***	−6.539***	−6.895***	−6.396***	−6.583***	−7.407***	−6.349***	−6.306***
	(1.265)	(1.320)	(1.331)	(1.412)	(1.274)	(1.319)	(1.640)	(2.010)	(1.295)
dist_rails	−0.098	0.085	0.171	0.119	0.424	0.086	0.105	0.517	0.431
	(1.549)	(1.528)	(1.498)	(1.548)	(1.538)	(1.528)	(1.531)	(1.624)	(1.481)
sh_pop_water	0.055	0.049	0.047	0.046	0.055	0.049	0.050	0.045	0.047
	(0.057)	(0.057)	(0.057)	(0.057)	(0.057)	(0.057)	(0.056)	(0.056)	(0.057)
internet	7.031***	6.383***	6.161***	7.017***	7.295***	6.383***	6.751***	6.385***	6.080***
	(1.730)	(1.583)	(1.539)	(1.752)	(1.890)	(1.583)	(1.667)	(1.766)	(1.575)
sh_unemp_prod	−1.558***	−1.569***	−1.575***	−1.577***	−1.555***	−1.569***	−1.569***	−1.578***	−1.575***
	(0.375)	(0.378)	(0.379)	(0.380)	(0.373)	(0.378)	(0.377)	(0.376)	(0.379)
sh_pop_prod	22.316***	22.320***	22.322***	22.322***	22.315***	22.320***	22.320***	22.323***	22.322***
	(3.054)	(3.055)	(3.055)	(3.056)	(3.053)	(3.055)	(3.054)	(3.054)	(3.055)
inst_qual	1.657***	1.654***	1.652***	1.651***	1.658***	1.654***	1.654***	1.651***	1.652***
	(0.435)	(0.434)	(0.434)	(0.434)	(0.434)	(0.434)	(0.434)	(0.434)	(0.434)
dist_BA	−0.475								
	(0.334)								
dist_TTC		−0.959**							
		(0.482)							
dist_LF			−1.440***						
			(0.415)						
dist_AI				0.955					
				(1.015)					
dist_TI					−0.365				
					(0.310)				
dist_TAC						−0.962**			
						(0.483)			
dist_STP							0.544		
							(0.511)		
dist_DAO								−1.893	
								(2.953)	
dist_SEZ									−1.996***
									(0.597)

(continued)

Table 5. Continued.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Constant	−1,358.199***	−1,346.302***	−1,330.160***	−1,423.577***	−1,369.374***	−1,346.272***	−1,409.699***	−1,341.746***	−1,328.710***
	(169.409)	(167.904)	(165.723)	(200.724)	(172.045)	(167.890)	(196.607)	(192.407)	(167.977)
Observations	19,824	19,824	19,824	19,824	19,824	19,824	19,824	19,824	19,824
Number of municipalities	2,478	2,478	2,478	2,478	2,478	2,478	2,478	2,478	2,478
Wald chi2	389.38	415.12	416.6	383.71	385.54	415.05	392.87	425.6	426.44
Prob > chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Overid test	1.272	0.437	0.145	0.0807	1.681	0.437	0.552	0.0831	0.146
Overid test (p-val)	0.259	0.508	0.703	0.776	0.195	0.509	0.457	0.773	0.702
Underid test	109.1	101.5	107.3	105.7	113.4	101.6	109.7	104.4	102.3
Underid test (p-val)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Source: developed by the authors. Clustered by municipality standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Advisory Centres (TAC), Technology Transfer Centres (TTC), and subzones of SEZs was conducive to a higher number of new firms in a municipality. The institutions that played a role in this regard were the ones helping entrepreneurs, for example, to secure capital (also of high risk) in Loan Funds, or advisory, knowledge and know-how services in TACs, as well as consulting, training and information services, to support technology transfer and commercialisation in TTCs, or to obtain tax exemptions and acquire investment land plots offered in subzones of SEZs. The highest observed magnitude of the distance variable to a particular type of the institution was observed in the case of most numerous institutions: subzones of SEZ (a few hundred sites) and Loan Funds.

On the other hand, the role of a distance to Science and Technology Parks (STP) and Technology Incubators (TI), proved to be insignificant. However, these institutions are most important only for a fraction of entities operating on the market, the ones which deal with R&D or highly innovative ventures, thus for an average company they are rather unimportant. The results of our research confirm it. Similarly, the distance to Academic Incubators (AI) was not significant either. Yet, the scope of work done by Academic Incubators is very limited (mostly addressed to students), and this type of business support does not prove to be efficient in stimulating entrepreneurship in Poland (Bąkowski et al., 2015; Wyszkowska, 2011). Many incubators do not actively support starting new businesses, instead, they limit their work to educational and promotional activities connected with entrepreneurship. Some seem to be rather dormant, while others offer advice, business support, low-cost business premises, legal assistance, coworking and networking opportunities, etc. The operation of Business Angels in most of the cases go beyond local or regional boundaries, thus their location is not an important factor for finding promising business ventures.

Nevertheless, in the light of the above results, we see grounds to support hypothesis H1, according to which closer distance to particular business environment institutions determines higher new firm creation. In this respect, four of nine types of institutions proved to be important in explaining the spatial distribution of new firms in municipalities. The ones with insignificant influence in this area were usually only important for a small fraction of companies, mostly ones which focused on highly innovative endeavours or intensive use of R&D. For robustness check, in the online appendix we also attach the results for a different dependent variable, where we also utilize a Hausman and Taylor estimator to depict the same factors affecting the number of new firms per capita (*new_firms_pc*). In most of the cases, they acknowledge the role of closeness to the same institutions as the results presented in Table 5.

In this respect, our findings on the diminishing role of institutions with increased distance, coincide with the results of an investigation by Kopczewska (2013). She dealt with distances of municipalities from capitals of voivodeships and proved that the socio-economic development of municipalities located more than 25 km away from the capital city was not affected by pro-development measures implemented by the capital city. Therefore, it gives us grounds to believe that the geographical distance can weaken the transmission of the development policy. Research results by Sucháček et al. (2017) concerning the spatial distribution of the 100 largest company

headquarters in the Czech Republic shows a distinct dominance of the whole Central Bohemian territory, with especially pronounced position of the capital city. Also, the results of a study by Ezcurra and Rios (2020), that covered the European Union, showed that the quality of government in neighbouring regions exerts a positive and statistically significant effect on a region's quality of government, confirming the relevance of spatial effects in this context, which are in their nature limited. Similarly, in our case, we find diminishing effects of the role of certain institutions as the distance to their establishments increases.

5. Conclusions

The institutional environment in which a firm operates depends on the location. The range of influence of an institution affects how the business operates. Institutions at least to some extent, create the investment conditions in a given location. They create the legal framework, decrease transaction costs and improve the infrastructure.

However, empirical evidence on the efficiency of institutions is relatively scarce. There is a lack of research results, describing institutions' role in making location decisions by entrepreneurs. Scientific research on the impact of distance on firms' locations is a relatively new field of study. The paper advances by identifying the role of the institutional framework's quality on new firm location as well as by showing the importance of distance from the particular types of institutions (supporting economic activity). A peculiar novelty is considering this research problem at the local level with the use of the proposed variables signalling (among other factors) the importance of distance to institutions. It indirectly signals some spatial boundaries or at least diminishing effects of policy realised by local institutions supporting business activity.

The results of estimations presented in this article confirm the positive influence of the quality of institutions on the location of new firms, acknowledging the role of local institutions in supporting entrepreneurship. Apart from the quality of institutions, another factor potentially influencing new firms' location may be the distance from various types of institutions. As presented, not all distances from different types of institutions are important in the location of new firms, especially when the study takes into account other location criteria along with the institutions' quality measure. From the point of view of location, local and numerous (not regional or national) institutions more intensely focused on the firms' functioning were usually of greater importance.

Our research also indicates one of the directions which local authorities should follow if they aim to stimulate local entrepreneurship. Geographical closeness to (above all) local institutions, in conjunction with the overall good quality of institutions/governance, was a significant determinant of the new firm location. However, the Granger causality tests proved that the relation between institutions and new firm creation is bidirectional, as not only institutional quality does Grander-cause new firms, but also new firms do Granger-cause better institutional quality.

The research results presented in this paper coincide with some findings reported by other researchers. For instance, Wilkin, (2013) implicated that it is necessary to create and use institutions or use the existing one (more broadly, use the institutional framework) in order to achieve good governance. The authors of the World Bank's

report (2002), addressing the role of institutions in the economy, suggested that to improve the quality of institutional structures of the market and state, the existing institutions should be supplemented with new ones and possibly made open to institutional innovations. Davis and Henderson (2003) also reported that the institutional environment is often associated with an asymmetric distribution of regional public investment projects. This is a consequence of favouring larger towns and a greater concentration of businesses in urban territories. Thus, institutional frameworks can provide some regions with an advantage in economic development over others. The concentration of political power, institutions, businesses, etc., is typically found in major urban centres. This may additionally strengthen institutional frameworks and deepen inequalities in the economic development within a country.

It is important to continue the search for universal measures applied to evaluate the quality of institutions on different levels of data aggregation. Possible findings might be applied to evaluate and determine the influence of institutions on the development of entrepreneurship (starting new firms, developing businesses) and, in the long term, on economic growth and development. However, there are certain obstacles to the establishment of universal measures, such as difficulties in taking measurements, availability of data, different conditions in which institutions function in different countries, or the need to ensure comparability of results achieved with such measures in subsequent years.

The findings of this study have to be seen in light of some limitations. Due to the availability of data on firms we had to use data aggregated to municipalities rather than at firm-level. Another limitation concerns the indicator we employed to approximate the quality of institutions and the number of variables available for the municipality level. With better datasets it would be possible to verify the influence of institutions on the location of firms in a more sophisticated manner. We could also capture sector-related effects or employ other indicators to assess the quality of institutions. The current study applied non-spatial models, and therefore indirect effects connected with the location of firms in adjacent municipalities were not included. However, this relationship is to a certain extent captured by the variable describing the distance to the largest cities, in and around which most institutions and firms tend to be located.

There may be some (uncontrolled in this paper) heterogeneity in the effects of institutions. Płoszaj (2013) indicated that there is a dependence between the spatial range of influence of an institution and its size (measured by the number of employees). He revealed that the larger the institution, the greater the importance of its activity on a regional level, but lower on a local one. Additionally, his results confirmed that the greater the spatial range of activities carried out by an institution, the greater the appreciation of the intensity of collaboration with others and the derived benefits. The results indicate the need for additional monitoring of the size of the institutions in further research, as it can potentially affect the results.

Notes

1. Quality of Government (QoG) and related concepts (Good Governance or State Capacity) refer to the desired effect of governing by public authorities (Agnafors, 2013) and mainly to the impact on the national level. However, each of these concepts takes into

consideration different aspects of institutions and the power they hold, and suggests making the evaluation of different dimensions of governance.
2. With *ipolate* command in STATA 16.
3. The data from 1995 are the oldest available at the level of communes, yet a lot of changes in the Polish economy has emerged as a result of ongoing transformation.

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