**RESEARCH ARTICLE**

# Fiscal transfers, local government, and entrepreneurship

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## Abstract

Can local government spending spur entrepreneurial activity? To answer this question, we study a setting where, around multiple pre-determined and non-manipulable thresholds, municipalities with lower tax revenues receive direct and different monetary grants from the national budget. Employing a fuzzy regression discontinuity design, we find a positive impact of fiscal transfers on the number of firms, especially sole proprietorships and small firms. The impact is stronger in municipalities where the opposition is more involved in the legislative process or more parties are represented in the municipal council.

## INTRODUCTION

Firm creation is central to the process of economic growth. Entrepreneurial activities create employment, generate technological progress, and spur capital formation. However, most often entrepreneurs need financial (and other) resources that they do not have when they intend to start their business (e.g., Hombert et al., 2020). In theory, capital markets could provide the means to finance profitable business projects. However, an important area of research has shown that on many occasions entrepreneurs face financial constraints: financiers are unwilling or unable to provide funding to positive net present value projects (see Kerr & Nanda, 2009, for a review). Among the possible causes of entrepreneurs' inability to raise finance are weak national and/or local institutions (Acemoglu & Robinson, 2012), corresponding wealth inequality (Braggion et al., 2021), poor legislation, and/or adverse culture.

In this paper, we examine the role of one possible mechanism to alleviate entrepreneurial constraints: local governmental spending. But this mechanism itself may suffer from limitations present in weak local institutions, so that it can only provide partial relief. We also investigate these limitations.

Establishing a causal link between local government funding and entrepreneurial activity is difficult since the level of funding and firm creation can be jointly determined. Entrepreneurship may also correlate with unobservable factors biasing any estimates.

To alleviate these concerns, we exploit an intergovernmental fiscal transfer program in Poland, which allows us to test the entrepreneurial effects of local government funding using a fuzzy regression discontinuity design. Under this program, municipalities with lower tax revenues receive direct monetary grants from the national budget which we henceforth refer to (in our operational labelling) as the *Subsidy*.[1] The eligibility and level of funding received by municipality vary at multiple predetermined thresholds, based on the ratio of the local per capita tax revenue to the average per capita tax revenue across all municipalities in the country. This rule makes it difficult for local politicians to manipulate the threshold, and therefore the differences in tax revenues of municipalities located closely around thresholds provide us with an exogenous variation in the level of funding available to local governments.

Our analysis documents a positive effect of fiscal transfers on the number of firms. Overall, an increase by one standard deviation in the per capita Subsidy level results in a 7% to 12% increase in the number of establishments per capita. For an average municipality with approximately 1,000 operating firms, our estimates imply 70 to 120 new businesses created for every 2 million Polish zloty (PLN) or 0.5 million U.S. dollars (USD) of additional transfers; or a cost of between 16,700 to 28,500 PLN or 4,175 to 7,125 USD per firm. This effect is mainly driven by the rise in sole proprietorships and by the number of establishments with up to nine employees. Higher transfers positively boost entrepreneurial activity in the construction, financial, manufacturing, retail, and services industries. Conversely, the number of farming, IT, and real estate industry establishments respond negatively to a higher Subsidy accruing to the local government.

The channel of extra firm formation is mainly increased municipal expenditures on social assistance. These expenditures include cash and in-kind support provided to low-income families, vulnerable individuals (e.g., single parents, disabled people), and/or unemployed persons. Such expenditures may to some extent also alleviate individuals' financial constraints. It may also include expenditures on the "professional upgrading" of individuals, providing them with training programs to acquire business development and operation skill. Investments in social assistance infrastructure (e.g., renovation, expansion, or development of care homes, day-care centers), as well as expenditures on the provision of various care services (which also falls into this category), may provide demand for services offered by the local construction, manufacturing, and services sector businesses.

Our results also suggest that new firms are likely to be established by residents living in the municipality rather than by individuals migrating to it. This is particularly common for sole proprietors who often register and operate their businesses from or nearby their place of residence. This allows them to benefit from personal connections to their potential clients, better understand local market conditions, and reduce overheads (i.e., commute costs or office/warehouse space rental) or take advantage of tax incentives available to businesses by deducting VAT costs on various items and services used for both business and private purposes (i.e., furniture, IT equipment, broadband costs, utility bills). Consistent with this conjecture, we do not find significant discontinuities in net migration or in the number of individuals moving into or away from municipalities located around the Subsidy thresholds. Consequently, these findings suggest that fiscal subsidies do not merely redistribute the number of firms across municipalities, but rather result in an overall increase in the number of establishments.

Through its positive effect on entrepreneurial activity, fiscal transfers also have important additional economic effects. We find, for example, that the fiscal transfers help alleviate unemployment, particularly among women. At the same time, new firm creation also results in higher wages in the private sector, predominantly in industries which may find it more difficult to retain existing employees (who may start a small firm themselves) and/or recruit new employees (as local unemployment decreases). Fiscal transfers also help with local innovation activity. We find a significant increase in the number of patent applications submitted by individual inventors in municipalities experiencing greater firm formation following receipt of higher transfers.

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[1] "Subsidy" is the official term for these intergovernmental fiscal transfers used in Poland. In Polish it is *subwencja*, which for example Google translates as "subsidy." Also, the Statistics Poland Website in English lists transfers as "subsidies."

We also uncover a significant heterogeneity in our baseline results stemming from municipal councils' characteristics. Specifically, positive entrepreneurial effects of fiscal transfers are much stronger in municipalities where the share of the opposition parties' council members involved in the legislative process is higher and where more parties are being represented in the council. This is likely due to the fact that in these municipalities, local government decisions may be under more intense scrutiny from opposition council members and hence indirectly from the electorate.

As such, our findings inform a recent political debate in Europe, where efforts are made to reduce the size of legislatures or alter the representation of political parties in the legislative process.[2] To this extent, our analysis suggests that any such policies should be carefully crafted to maintain or improve the diversity of governments and councils in terms of representation of political factions and opposition members.

The rest of the paper is organized as follows. In the next section we introduce a theoretical framework and provide a literature review. In the following sections, we discuss the institutional framework, then we describe our identification strategy and data. Further sections provide the results of diagnostic tests and identifying assumptions, present our baseline results, link the number of establishments to fiscal transfers, and test for potential mechanisms behind baseline results. We also analyze heterogeneity in baseline results stemming from the local government characteristics. We verify the robustness of our estimates with several sensitivity tests, and the final section concludes.

# THEORETICAL FRAMEWORK AND LITERATURE REVIEW

We contribute to a vast literature that models and documents the impact of government purchases on economic activity (Figure 1), in terms of output, consumption, real wages, labor supply and demand, and/or employment. Theoretical and empirical work suggests that the joint impact of government purchases and taxes and/or debt in the short and long run will depend on the spending category, the state of the business cycle and confidence levels, the monetary policy stance, the openness of the economy, and habits and rigidities (e.g., see Beetsma & Giuliodori, 2011, for a review).

More specifically we contribute to the literature that assesses the impact of supranational and/or national transfers to fund local government spending to stimulate local economic activity, e.g., per capita income growth and per capita investment (see the lower panel in Figure 1).

While the theoretical literature conceptualizing such transfers involves similar impact-determining ingredients, yet highlights the relevance of the political process (Bradford & Oates, 1971a, 1971b), the empirical literature (employing similar methodological settings) overall finds a positive impact, but also observes a wide dispersion in how effectively funds are used (e.g., Becker et al., 2013). Corbi et al. (2019), for example, studied how federal transfers to municipal governments affect the local labour markets in Brazil (see also, e.g., Gadenne, 2017). They found an increase in local employment at a cost per job of about 8,000 USD, with the impact mainly situated in services and in less financially developed municipalities.

Complementing this line of work, we focus on the channels and the impact of national subsidy–based local government spending on local entrepreneurship and technological activity in a high-income country,[3] along the strength of local political accountability.

Our paper is also related to studies examining other government policies aimed at stimulating firm formation. Distinguishing between *funding* policies encouraging the supply of funding to entrepreneurs and *founding* policies taking the form of non-monetary support such as mentoring or

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[2] Such debates are currently taking place in France (Chassany & Keohane, 2018), Greece (Associated Press, 2020), and the United Kingdom (BBC News, 2018; Electoral Reform Society, n.d.). The results of a recent referendum in Italy show that 70% of the voters support the reduction of the parliament members by a third (Legorano, 2020).

[3] Brazil is classified by the World Bank as a middle-income country with about half the GDP (PPP) per capita of Poland (in 2017, $15,553 versus $29,924; The World Bank, n.d.).

For open and closed national economies, in the short and long run,
the joint impact of government purchases and taxes and/or debt will depend on the:

- Spending category
- State of the business cycle, and confidence levels
- Monetary policy stance
- Openness of the economy
- Habits and rigidities

| | Output | Consumption | Real wage | Labour supply | Labour demand | Employment |
|---|---|---|---|---|---|---|
| Neo-classical | ↑ | ↓ | ↓ | ↑ | 0 | ↑ |
| Deep habits | ↑ | ↑ | ↑ | ↑ | ↑ | ↑ |
| NK – nominal rigidities only | ↑ | ↓ | ↑ | ↑ | ↑ | ↑ |
| NK – rule of thumb | ↑ | ↑ | ↑ | ↑ | ↑ | ↑ |

Notes. NK: New Keynesian. *Sources: Beetsma & Giuliodori (2011); Pappa (2009).*

For regional economies, in the short and long run,
the singular impact of local government purchases and assistance for:

- Various spending and assistance categories
- Across states of the business cycle, and confidence levels
- Under a common monetary policy stance
- Local transfers only
- Habits and rigidities
- A political process

| Entrepreneurship | Migration | Unemployment | Wages | Patents |
|---|---|---|---|---|
| ↑ | ↑ | ↑ | ↑ | ↑ |

**FIGURE 1**   Impact of government purchases on economic activity.

training, Hellmann and Thiele (2019) suggested that the former policies typically provide greater entrepreneurial stimulus (e.g., Guerini & Quas, 2016). However, the authors acknowledged that the latter policies may be less costly and result in lower rates of funding misallocation, which is more likely to be present in the case of direct financing transfers. To this extent, our results support the view that founding policies (expenditure on "professional upgrading" initiatives or social assistance expenditure increasing demand for services) under certain conditions (of strong political accountability) can successfully increase firm formation.

The existing literature also relates higher business entry rates to the quality of public administration and policies. Nistotskaya and Cingolani (2016), for example, found that meritocratic recruitment and tenure protection in public bureaucracy contributes to the improved quality of regulation and subsequently increases entrepreneurship rates. Our tests highlighting heterogeneity in the effect of fiscal transfers on business formation resulting from higher representation of opposition parties on municipal councils are in line with this view since political competition is likely to result in more efficient policies and expenditure encouraging entrepreneurship.

In sum, our estimates demonstrate the beneficial role that government spending on social assistance can play to under the right circumstances alleviate entrepreneurial constraints and boost local firm creation and employment.

## INSTITUTIONAL FRAMEWORK: FISCAL TRANSFERS IN POLAND

Since 1999, local governance in Poland has been executed at three levels of administrative subdivisions, which include 16 provinces (*wojewodztwa*) divided into 380 counties (*powiats*) and further split into 2,478 municipalities (*gminas*). Each subdivision generates fiscal revenues via taxes and fees

paid by individuals and firms, which partly support the national budget. With the remaining part of revenues, local governments, including municipal councils, are responsible for providing services and goods to residents and businesses.[4] An important part of municipal responsibilities involves stimulating employment. To do so, local councils may, for example, finance training programs and workshops to increase residents' employability or help them set up businesses. Alternatively, municipalities may alleviate resource constraints through the provision of cash and in-kind benefits to individuals, promote firm formation or relocation of businesses through increased investments, and/or boost the demand for services and products provided by various businesses.

The central government set up several fiscal transfer schemes to financially support municipalities in completing their tasks. On November 13, 2003, the Polish government passed a legislation (effective from January 1, 2004), allowing local governments to receive each year direct regional monetary transfers from the national budget in the form of subsidies. Local governments have complete autonomy with respect to the allocation of these funds. They are neither required to provide plans describing the intended use of subsidy transfers, nor are they required to report the use of these funds to the state.

Each year, the Ministry of Finance announces the total amount of funds distributed among regional governments as part of these fiscal transfers. The so-called *base subsidy* constitutes one of the most significant parts of these fiscal transfers, on average accounting for a 10% share of the municipalities' overall revenue and in some regions even reaching as high as 30% share of the overall revenue.

A municipality automatically becomes a recipient of this subsidy if its per capita tax revenue ($X_m$) is lower than 92% of the per capita tax revenue of all municipalities ($X$). In general the amount received by each municipality in a given year ($T_{m,t}$) is calculated according to the following formula:

$$T_{m,t} = p_{m,t-2} \left[ \alpha \left( \beta X_{t-2} - X_{m,t-2} \right) + \gamma X_{t-2} \right], \tag{1}$$

where $p_{m,t-2}$ represents the number of residents in municipality $m$ (on December 31st of the year preceding the subsidy announcement year), $X_{m,t-2}$ is per capita tax revenue of municipality $m$, and $X_{t-2}$ is per capita tax revenue of all municipalities in the country at the end of year $t$-2. The values of coefficients $\alpha$, $\beta$, and $\gamma$ depend on the level of per capita tax revenue ($X_m$) and significantly change at three pre-determined thresholds, illustrated in Figure 2. These thresholds will play a key role in our identification strategy.

The timing of this subsidy policy is illustrated in Figure 3. Funds under this fiscal transfer program are distributed throughout year $t$ (pay-out year), in 12 equal monthly installments. Regions' eligibility for receipt of these transfers and the amount of the transfer is announced around October 15th of a preceding pay-out year $(t-1)$. The eligibility criteria and the size of this subsidy are based on municipalities' revenues in the year preceding the announcement year and 2 years prior to the pay-out year $(t-2)$.[5] The revenue information is reported to the Ministry of Finance by June 30th of the announcement year $(t-1)$.

In addition to the base subsidy, municipalities receive a *supplementary subsidy* and a *countervailing subsidy*. The base and the supplementary subsidies combined are called the *compensatory subsidy* (henceforth, indicated with its variable name the Subsidy).[6] Although municipalities in Poland may

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[4] Examples of municipalities' tasks include maintenance and development of infrastructure (i.e., transportation systems, communication networks, sewage, water, and electric systems); nature conservation; provision of social services (i.e., social housing, welfare support, care homes); and supporting health care and public schools.

[5] The revenue obtained through fiscal transfers is not considered in this calculation.

[6] The supplementary subsidy is based on the municipalities' population density. However, the allocation mechanism of this subsidy is very simple. Municipalities where the population density is lower than the mean density of all municipalities in the country receive this part of the subsidy. The countervailing subsidy mainly depends on municipal social security expenses, including housing allowances and child support. The allocation mechanism of this subsidy does not provide us with any clearly defined thresholds as in case of the base subsidy. Municipalities may also obtain direct grants from the central government and since 2006 may also seek funding from the European Union. However, these funds are allocated for specific investment projects and local governments cannot divert these funds to projects other than pre-specified ones. The allocation
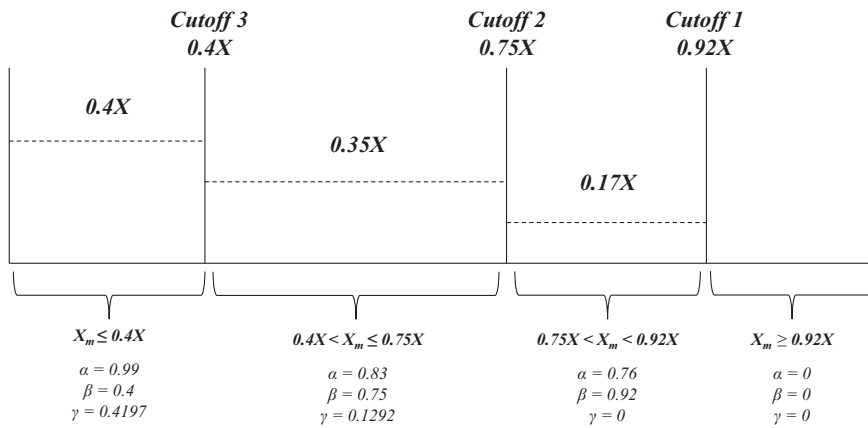
**FIGURE 2** Base subsidy eligibility criteria and calculation.

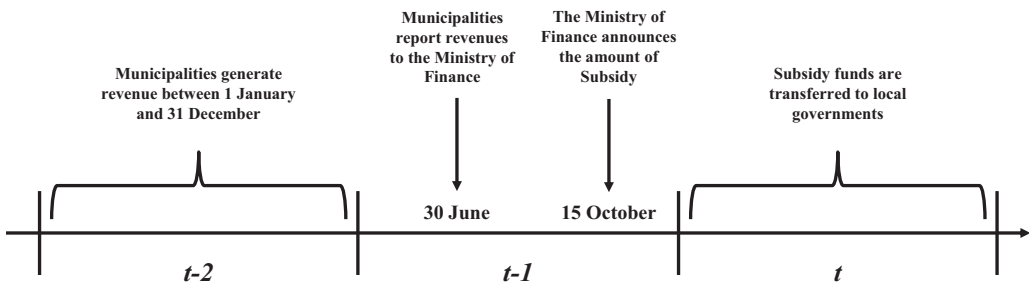*Notes*: This figure illustrates the eligibility for and the calculation of the base subsidy.

**FIGURE 3** Fiscal transfers timeline.

receive funding in the form of other fiscal transfers, the allocation mechanism of the base subsidy makes it very appealing to study the entrepreneurial effects of fiscal transfers.

First, the level of these transfers depends on multiple thresholds. This fact mitigates the concern that the estimates may significantly differ with increasing distance from the threshold. Second, the existence of multiple thresholds also provides significant variation in the level of subsidy funding. During the sample period, 2,031 municipalities received subsidy funding for at least 1 year, and 993 municipalities changed their eligibility status. In 274 cases, municipalities started to receive this type of funding previously not having access to it, and in 350 cases, municipalities completely lost their access to these fiscal transfers. In 723 instances, municipalities crossed a lower threshold and began receiving a higher volume of the subsidy, while on 1,106 occasions, municipalities crossed a higher threshold and their transfers decreased.[7]

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mechanism of these grants also does not depend on any pre-defined thresholds. Due to data limitations, we are not able to distinguish between the actual base and supplementary subsidies. Therefore, our analysis associates municipalities' revenues, expenses, and entrepreneurial outcomes to the compensatory subsidy. However, the allocation mechanism of the base subsidy explains variation in more than 85% of the law-implied compensatory subsidy. Further, the level of the supplementary subsidy is not expected to vary at the base subsidy thresholds as it (as described above) depends purely on municipalities' population density. Once we have explained our methodology and provided the first results for the impact of the compensatory subsidy, we will provide some estimates for the law-implied supplementary subsidy that confirm a total absence of discontinuities mitigating any concerns that differences in the level of these transfers alone may be driving changes in entrepreneurial outcomes.

[7] Finally, county and province governments are also eligible to receive fiscal transfers which they may invest in municipalities. However, the allocation mechanism significantly differs from municipalities' allocation, with only one threshold determining counties and provinces eligibility to receive funding. This significantly reduces variability in the level of transfers. In addition, within-municipality analysis exploiting changes in

Third, and most importantly, the specific allocation mechanism of the Subsidy makes it very difficult for municipal authorities to systematically manipulate access to or the level of received funds. Municipalities' revenue depends on a myriad of factors, and as such, it is difficult for local governments to precisely manipulate its level. However, to the extent that local governments can adjust their revenues, municipalities' eligibility to receive the Subsidy partly also depends on tax revenues of all other, more than 2,400, municipalities in the country. Therefore, while reducing revenue could be a beneficial strategy for some municipalities, it is difficult to precisely estimate what reduction will be needed to grant them a level of fiscal transfer high enough to compensate the foregone own funds. As such, strategic manipulation is unlikely to exist. For this reason, differences in municipalities' revenues around thresholds are likely to provide us with exogenous variation in the level of fiscal transfers, which can be considered as good as random (Lee & Lemieux, 2010).

## IDENTIFICATION STRATEGY AND DATA

## Identification strategy and empirical specifications

Despite the above-mentioned advantages of the base subsidy to study entrepreneurial effects of fiscal transfers, the allocation mechanism of this program is prone to error. The actual level of Subsidy funding received by municipality may differ from the law-implied level. This may occur due to simple miscalculations and/or even to misreporting of revenues or population.[8] Therefore, following Brollo et al. (2013) and Corbi et al. (2019), our identification strategy relies on a fuzzy regression discontinuity design (abbreviated as fuzzy-RDD).[9] We first provide reduced-form results estimating:

$$Y_{it} = \delta \widetilde{T}_{it} + \vartheta f(X_{it-2}) + \varphi_i + \varphi_{ct} + \varphi_{rt} + \varepsilon_{it}, \tag{2}$$

where per capita revenues, expenses, and the number of establishments in municipality $i$ in year $t$ ($Y_{it}$) are associated with the per capita law-implied level of the Subsidy transfers ($\widetilde{T}_{it}$).[10] $\varphi_i$, $\varphi_{ct}$, $\varphi_{rt}$ represent municipality, cutoff-year, and county-year fixed effects. Municipality fixed effects control for time-invariant factors affecting the level of fiscal transfers, revenues, expenses, and entrepreneurial outcomes, for instance, geographic location or availability of natural resources. Cutoff-year fixed effects control for differences between municipalities in different cutoff brackets, defined below. County-year fixed effects account for investment and social projects undertaken by county, province, or national agencies in municipalities. We also saturate specification 2 with $f(X_{it-2})$, first-order polynomial expressions of normalized per capita tax revenue (the assignment variable), which account for municipalities distance from the nearest cutoff in year $t$-2.

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the municipalities' subsidy allows us to control for differences in the level of fiscal transfers at higher administrative subdivisions, as well as many other, difficult to observe factors affecting municipal revenues and entrepreneurship.

[8] Following legislation of August 27, 2009, the Ministry of Finance can sollicit external audits that may uncover misreporting of revenues by municipal authorities.

[9] Equation 1 suggests that discontinuities in per capita Subsidy transfers may be only marginal, and we could only observe a change in the growth of per capita Subsidy transfers as a function of a running variable at thresholds. In such case, regression kink design (Card et al., 2016) would be a more appropriate approach to identify the effect of Subsidy transfers on entrepreneurship. However, as illustrated in Appendix Figure A1, we do observe discontinuities in Subsidy transfers at each threshold in our sample. Figure A1(a) illustrates these discontinuities for Subsidy transfers in levels and Appendix Figure A1(b) for per capita Subsidy transfers. To illustrate discontinuities more clearly, in panels C and panel D of Appendix Figure A1 we also present the discontinuity in Base Subsidy transfers of municipalities located at close proximity to threshold/cutoff 1 (92% of the per capita tax revenue of all municipalities) in year 2018. This example shows that although, in per capita terms (panel D) the discontinuity may appear small, it denotes significant differences in the total volume of funds received by municipalities located very close to the threshold. All appendices are available at the end of this article as it appears in JPAM online. Go to the publisher's website and use the search engine to locate the article at https://onlinelibrary.wiley.com.

[10] Appendix Figure A2 provides histograms illustrating the distribution of our main dependent variables, per capita number of total establishments, sole proprietorships, private and public sector firms. Apart from the public sector establishments, all our main dependent variables are normally distributed. This is due to the very small number of such establishments operating in most municipalities. In unreported regressions we use a logarithmic transformation of our main explanatory variables. Their distribution somewhat "improves," i.e., become more normally distributed, yet our main inferences are robust to this logarithmic transformation.
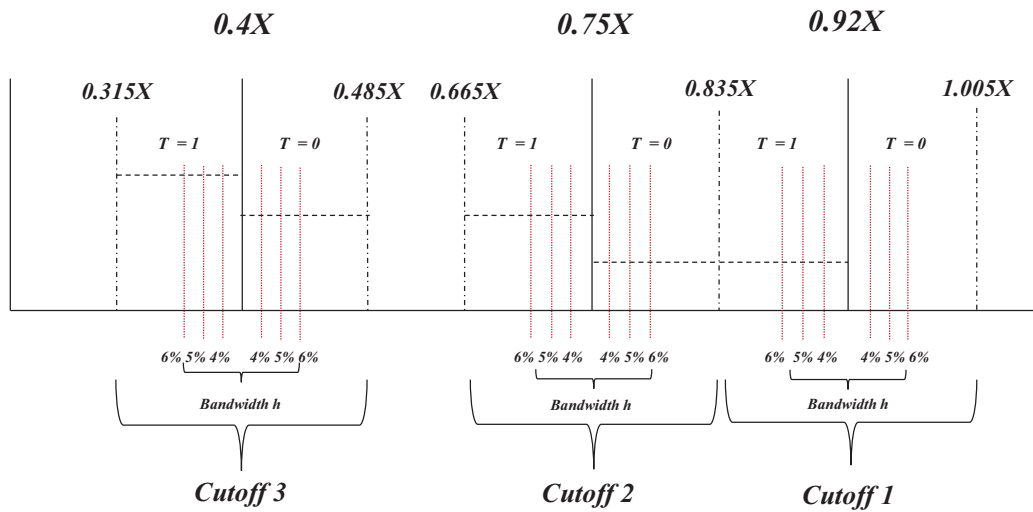
**FIGURE 4** Sample selection.

[Color figure can be viewed at wileyonlinelibrary.com]

*Notes*: This figure illustrates the sample selection based on three bandwidths around the three cutoffs.

The fuzzy-RDD estimations, in the first stage, link the actual Subsidy to law-implied transfers:

$$T_{it} = \delta \widetilde{T}_{it} + \vartheta f(X_{it-2}) + \varphi_i + \varphi_{ct} + \varphi_{rt} + \varepsilon_{it}, \tag{3}$$

where $T_{it}$ denotes actual per capita level of funds transferred to municipality $i$ in year $t$. In the second stage, the number of establishments is associated with $\widehat{T}_{it}$, the component of the Subsidy implied by its non-linear allocation mechanism, estimated in the first stage. The second-stage model reads:

$$Y_{it} = \delta \widehat{T}_{it} + \vartheta f(X_{it-2}) + \varphi_i + \varphi_{ct} + \varphi_{rt} + \varepsilon_{it}. \tag{4}$$

In all specifications, we cluster heteroscedasticity-adjusted standard errors at the municipality level to account for serial correlation. We provide estimates for the main results in levels and first-differences. In the latter case, we restrict our sample to municipalities, which in year $t$ and $t$-$1$ are located in the same cutoff and bandwidth. Specifications include cutoff-year and county-year fixed effects, first-order polynomials for both periods but exclude municipality fixed effects. First-difference estimates allow for a growth interpretation of our results.[11]

To estimate our results, we construct three equal cutoff brackets centred around each threshold. We assign each municipality-year observation to the nearest threshold. Next, we normalize the per capita revenue of each municipality by subtracting the ratio of municipality's per capita tax revenue to the per capita tax revenue of all municipalities from the threshold value in each cutoff bracket.[12] We estimate specifications 2 to 4 using three bandwidths restricting our sample to observations located within 6%, 5%, and 4% of the normalized per capita revenue on each side of the threshold. Figure 4 illustrates our sample selection process.[13]

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[11] To preserve space, we present the estimates for regressions in first differences as well as 5% and 4% bandwidths only for our main results in Table 2. All other results are presented only for estimates in levels and for 6% bandwidth. However, also in other tables the first-differences, and additional bandwidth estimates are in line with those in levels.

[12] The reason we follow this procedure is to make the municipal distances to the relevant threshold comparable across the three different thresholds.

[13] To test the robustness of our estimates to the choice of different bandwidths, we re-estimate all specifications using the optimal bandwidth selection procedure proposed by Calonico et al. (2014) and Calonico et al. (2020). The results of this robustness test are presented in Appendix Table A1 and show that our reported estimates are not affected by this alternative choice of bandwidth. We present estimates obtained using

# Data

Our data set contains municipality-year level information drawn from three sources: Statistics Poland (Central Statistical Office of Poland), the Polish Ministry of Finance, the Polish Patent Office, and the National Electoral Commission of Poland.

Statistics Poland[14] provides us with the number of establishments operating in each municipality, municipal demographics, migration patterns, municipal public finances, and unemployment rates. We can differentiate between sole proprietorships/personal businesses, incorporated, and public sector firms. We can also distinguish between establishments of different sizes and industries. In addition, Statistics Poland also provides information on the number of newly registered and deregistered establishments through the National Official Business Register (REGON). In terms of demographics, we obtain information on municipalities' population and a population density, which allow us to calculate per capita numbers of establishments. Migration patterns include information on net migration within each municipality, as well as separate information on the number of individuals moving into and out of each municipality. Public finances data coverage includes municipalities revenues and expenditure. The former agency provides us with the level of actual fiscal transfers, direct grants, and funding received from the European Union. Expenditures allows us distinguishing between municipalities' expenses on public administration, public debt repayment and all other expenses. Unemployment data cover the ratio of all unemployed individuals in their working age over the total workforce, and in addition measure unemployment rates separately for women and men. From Statistics Poland we procured proprietary information for each municipality on average wages in the private and public sector and by industry.

The Ministry of Finance[15] publishes final indicators determining eligibility for and the level of the Subsidy. These include per capita tax revenue of each municipality ($X_m$) and per capita tax revenue of all municipalities in the country ($X$) since 2012.[16] Together with population data, we use these indicators to estimate the law-implied level of fiscal transfers.

The Polish Patent Office[17] provides information on patent applications submitted in each municipality on behalf of higher education and science institutes, or individual inventors. The National Electoral Commission[18] maintains a record of all election results taking place in Poland, including elections to municipal councils. We can identify the party affiliation of each council member, and we use this information to determine how many of these members belong to the political party with the highest support and how many political parties are represented in the council. This information allows us to test whether the composition of local governments results in heterogeneity in the effect of fiscal transfers on entrepreneurial activity.

Overall, our sample covers 17,276 municipality-year observations for more than 2,400 municipalities for the years 2012 to 2018. Restricting the sample to municipalities within 6%, 5%, and 4% bandwidths lowers the number of observations to 3,202, 2,294, and 1,475, respectively.[19] In panel A of Appendix Table A2, we report summary statistics on fiscal transfers and establishments for the

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bandwidths based on a one-sided Mean Square Error (MSE) or a Coverage Error Rate (CER) optimal bandwidth selecting criterion, while adjusting for clustering of standard errors at the municipality level. In unreported tests we also find that our results are robust to employing two further MSE- and CER-optimal bandwidth selecting criteria.

[14] https://stat.gov.pl/en/

[15] https://www.gov.pl/web/finance

[16] The Ministry of Finance website publishes indicators used to determine *Subsidy* eligibility and level for the past 3 years. We retrieve information for earlier years (since 2012) from the Ministry's archives.

[17] https://ewyszukiwarka.pue.uprp.gov.pl

[18] https://wybory.gov.pl/index/index.html?language=en&tab=wybory&accessibility=off

[19] To benchmark our settings further, notice for example that the number of observations is significantly higher compared to the sample size in Brollo et al. (2013). However, in Table 17 panel B we present similar results obtained using municipalities within the 30%, 20%, and 10% bandwidths, which increases the number of observations to 8,473, 8,283, and 6,460, respectively, which is comparable to the sample size in for example Corbi et al. (2019).
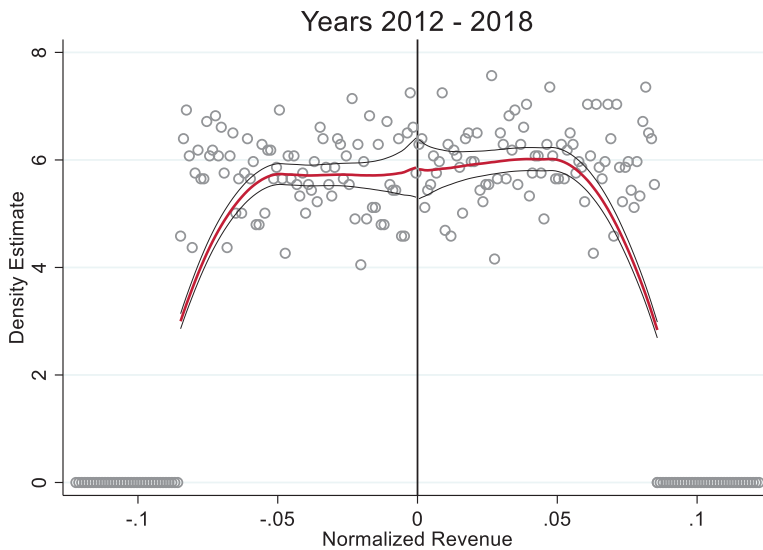
**FIGURE 5** Manipulation tests - McCrary density test.
[Color figure can be viewed at wileyonlinelibrary.com]
*Notes*: This figure illustrates the McCrary density test for the years 2012–2018.

whole sample and observations within the three bandwidths. An average municipality receives nearly 2.9 million PLN (725,000 USD) in Subsidy funding. However, the amount of these transfers can range up to 40 million PLN (10 million USD).[20] On average, 1,585 establishments operate in a municipality, of which 73% are sole proprietorships/personal businesses and 23% private sector establishments. Public sector firms account for the remaining 4% of total establishments. Additional descriptive statistics presented in panel B of Appendix Table A2 reveal that establishments with up to nine employees and operating in the construction, manufacturing, and retail industries dominate our sample.

## PRELIMINARY TESTS

## Diagnostic tests

The validity of our identification strategy relies on the assumption that municipalities cannot systematically manipulate their treatment status (Lee & Lemieux, 2010). In the previous section, we outline reasons which suggest that such manipulation is unlikely to be present in our setting. To provide formal evidence for the lack of threshold manipulation, we perform a McCrary (2008) density test. Figure 5 illustrates the results of this analysis for the full sample. The density of municipalities does not exhibit any significant discontinuity at the Subsidy thresholds, suggesting that, as predicted, municipalities do not systematically manipulate their access to or level of received transfers.[21]

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[20] The translation employed throughout is using 2018 prices and rates. We re-run the entire analysis in nominal prices, but our main findings are unaffected (which is not surprising as the average nominal inflation rate in Poland for the 2011 to 2018 period equals only 1.4%), with rates even being negative in 2015 and 2016.

[21] Appendix Figure A3 reports McCrary (2008) tests for each individual year. We do not find statistically significant discontinuities in any particular year. In unreported tests we perform McCrary tests separately for each cutoff and year. Here, we find several cases in which density exhibits discontinuity at thresholds. However, although in some instances the density of municipalities is higher below the threshold, there are also a few cases in which such density is higher above the threshold, such that more municipalities receive lower Subsidy transfers. This is inconsistent with the notion that municipalities precisely and systematically manipulate their revenues to receive higher transfers. To avoid that

Another assumption requires that factors other than Subsidy funding, potentially affecting entrepreneurial activity in municipalities, are continuous functions of the Subsidy thresholds (Imbens & Lemieux, 2008). Such potential factors are likely to include other sources of municipal revenue: direct grants from the central budget, funding from the European Union received by local governments for specific investment projects, or countervailing subsidy, awarded to support local governments' social security expenses. Other sources of funding investment projects may include bank loans and an increase in own revenue, which municipalities may achieve by raising taxes and fees.[22]

Given the level of these funds is not determined by the Subsidy mechanism, we do not expect it to significantly differ at Subsidy thresholds. The results presented in Appendix Table A3 and Figure A4 confirm this prediction. We do not find statistically significant discontinuities in the level of direct grants (Table A3 panel A), EU funding (Table A3 panel B), and other subsidies (Table A3 panel C). Municipal public debt expenses do not significantly differ at the threshold (Table A3 panel D), which suggests that local governments do not increase the level of public debt. Finally, we do not find evidence that municipalities increase taxes or fees since their own revenue does not exhibit discontinuity at the Subsidy thresholds (panel E).[23,24]

## Subsidy transfers and municipal expenditure around thresholds

In this section, we first document discontinuity in the level of the Subsidy. We begin with visual evidence in Figure 6.[25] We observe a sharp discontinuity in both the actual (panel A) and law-implied (panel B) transfers. Patterns in both panels are very similar. To verify whether the allocation mechanism is perfect or if errors do exist, we associate the actual per capita level of the Subsidy to the law-implied per capita level using specification 4. Under the perfect transfer assignment mechanism, we would expect both the goodness of fit of the model and the estimate on the law-implied Subsidy to be equal to one.

The results are presented in Table 1. Coefficients show very high correlations ranging between 0.86 and 0.99, and the within $R^2$ ranges between 0.83 and 0.99. Overall, these findings confirm that the Subsidy assignment mechanism is not always accurate. However, they also document a high relevance of the instrument in the first stage, a necessary condition for fuzzy-RDD estimations.[26]

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such discontinuity may influence our results we perform tests with a sample excluding municipality-year observations for cutoffs and years in which discontinuities are present. The results, available upon request, are consistent with our baseline tests.

[22] Issuing municipal bonds is not common in Poland and infrequently only the largest Polish cities supplement their budgets using municipal bonds.

[23] Significant changes in Subsidy funding may influence municipal councils' incentives to supplement their budgets using other sources. To test this assumption, we re-estimate the results presented in Appendix Table A3 on a sample of municipalities which cross the threshold to receive higher or lower level of Subsidy funding. The results are presented in Appendix Table A4. Again, we do not observe any statistically significant changes in the level of direct grants, EU funding, other subsidies, municipal debt expenses, or own revenue. This is intuitive given that applications for EU funding and direct grants typically take considerable time to succeed. The results also indicate that municipalities prefer to operate with a reduced budget and cut their expenses rather than increase municipal debt, taxes and/or fees, which may have negative repercussions for councils in the next electoral cycle.

[24] A remaining concern is that the administration in some municipalities may be better staffed or equipped to predict future cutoffs levels and manipulate thresholds. This would require a higher expenditure on public administration. To test this potential threat to our identification strategy, we look at discontinuity in municipal expenses on public administration in two and three years preceding the Subsidy transfers. If the Subsidy transfers in year t could be determined by manipulated level of municipalities own revenue, this manipulation would have to occur in year t-2 or earlier. Panel A of Table A5 in the Online Appendix presents the results which do not indicate any discontinuity in level of public administration expenses at Subsidy cutoffs, refuting this hypothesis. In addition, lower (higher) availability of other external funding (direct grants, EU funding, other subsidies, or municipal debt) may motivate municipal authorities to increase their Subsidy funding. The results in panels B-E of Table A5 show no significant discontinuities in external sources of municipal revenues in years t-2 and t-3.

[25] We construct the Figure 6 plots by first regressing actual and law-implied per capita base subsidy transfers on a set of municipality, state-year, and cutoff-year dummies to net out fixed effects. We plot the residuals from these regressions, averaged over 0.1 unit of the normalized revenue. In Appendix Figure A5, we present graphs documenting the discontinuity in each individual threshold.

[26] In panel A of Appendix Figure A6 and Table A6 we confirm a total absence of discontinuities in the estimated law-implied supplementary subsidy mitigating concerns that differences in the level of these transfers alone may be driving changes in entrepreneurial outcomes. In panel B of Appendix Figure A6 we also show lack of discontinuity in population density, which determines the level of supplementary subsidy.
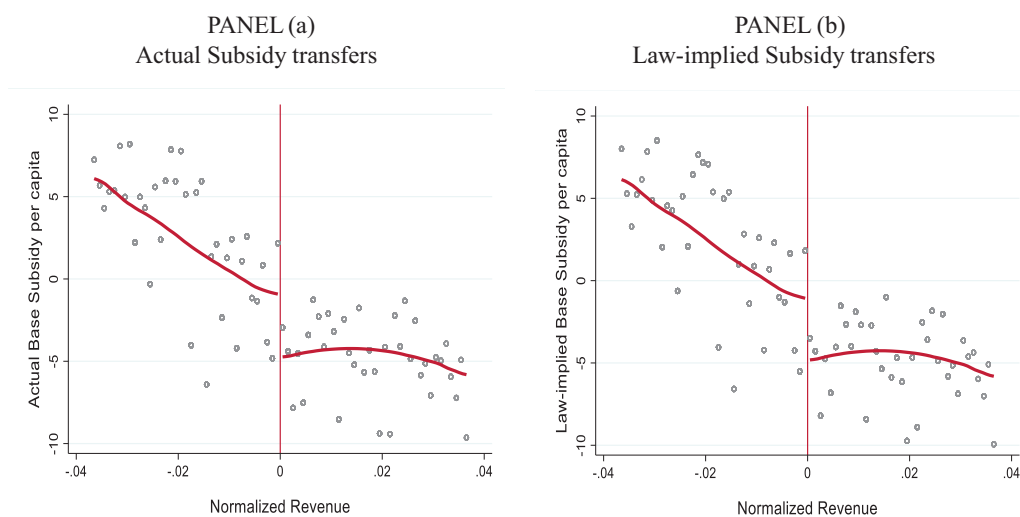
PANEL (a)
Actual Subsidy transfers

PANEL (b)
Law-implied Subsidy transfers



**FIGURE 6**   Actual and law implied regional transfers around the cutoffs.

[Color figure can be viewed at wileyonlinelibrary.com]

*Notes*: This figure illustrates the actual and law implied regional transfers around the around the normalized revenue cutoff brackets. Above zero normalized revenue the subsidy is observed to decrease.

**TABLE 1**   Actual and law-implied fiscal transfers.

| Local estimates | in levels | | | | | |
|---|---|---|---|---|---|---|
| **Bandwidth** | **<6%** | **<5%** | **<4%** | **<6%** | **<5%** | **<4%** |
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** | **(6)** |
| Law-implied transfers per capita | 0.993*** | 0.993*** | 0.992*** | 0.966*** | 0.927*** | 0.866*** |
| | (0.003) | (0.003) | (0.004) | (0.049) | (0.077) | (0.117) |
| Number of municipalities | 1,311 | 1,194 | 1,012 | 930 | 734 | 513 |
| Observations | 3,665 | 2,873 | 2,082 | 3,202 | 2,294 | 1,475 |
| Within (adjusted) $R^2$ | 0.993 | 0.992 | 0.990 | 0.938 | 0.902 | 0.830 |
| Municipality FE | NO | NO | NO | YES | YES | YES |
| County-year FE | YES | YES | YES | YES | YES | YES |
| Cutoff-year FE | YES | YES | YES | YES | YES | YES |
| First-order polynomial | NO | NO | NO | YES | YES | YES |

*Notes*: The table reports OLS coefficients and heteroscedasticity-adjusted standard errors clustered at the municipality level (in parentheses) obtained using specification 3. Regressions associate the actual level of per capita *Subsidy* transfers to law-implied per capita *Subsidy* transfers. Variables are expressed in levels. "Yes" indicates that the set of fixed effects or first-order polynomial is included. "No" indicates that the set of fixed effects or first-order polynomial is not included. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

   Another important question relates to how municipalities utilize funds received under the Subsidy scheme. Given that local governments enjoy an absolute autonomy in allocating this funding, a concern arises that they may not be put to productive use. For instance, local governments may increase expenses on public administration, raising employees' salaries and distributing bonuses or monetary awards among civil servants. Alternatively, councils may also decide to save additional funds. In both cases, fiscal transfers are unlikely to result in a higher rate of entrepreneurship. Therefore, in the next set of tests, we link the law-implied Subsidy to measures of municipal expenses and budget balance.

   In panel A of Appendix Table A7, the dependent variable is a ratio of the per capita municipal expenses on public administration to total per capita expenses. In panel B, the dependent variable

is a ratio of all other per capita expenses to per capita total expenses. Coefficients in both panels document that the Subsidy funding results in municipalities devoting less of their expenses to public administration. To document the mechanism behind entrepreneurial effects, we further elaborate on these findings in the section "The Mechanism of Impact and Additional Economic Effects," examining which municipal expenses exactly increase. In Appendix Table A7 panel C, we relate municipalities' budget balance to the law-implied level of Subsidy. Lack of statistical significance on all coefficients, in both level and first-difference specifications, suggests that, at thresholds, municipalities run balanced budgets.[27]

## BASELINE RESULTS

In this section, we discuss the effect of the Subsidy transfers on entrepreneurial activity. We first focus on the number of establishments, differentiating by the establishments' ownership sector. Next, we present results differentiating by business size and industry, and examine the duration of entrepreneurial effects.

### Fiscal transfers and entrepreneurship

Figure 7 illustrates the impact of an increase in the Subsidy around the zero normalized revenue cutoff on the total (raw) number of establishments, sole proprietorships, (other) private sector establishments, and public sector establishments. Recall from Figure 6 that municipalities with normalized revenues below the zero cutoff face an increase in the Subsidy. Hence, Figure 7 shows that this increase in the Subsidy results in an increase in the total number of establishments, in particular in sole proprietorships, but not so in private and public sector establishments. Therefore, the granting of subsidies to municipal governments spurs the creation of new sole proprietorships, but not of new private sector establishments (other than sole proprietorships) and public sector establishments. The latter two types are presumably too large for swift creation spurred by increases in local subsidies.

Next, we turn the estimates of this impact of Subsidy transfers on entrepreneurship in Table 2. The table reports the coefficient estimates from both ordinary least squares (OLS) and as explained before the instrumented fuzzy regression discontinuity design (fuzzy-RDD [IV]) estimations. Heteroscedasticity-adjusted standard errors clustered at the municipality level are reported below the coefficient estimates (in parentheses). As dependent variables the table features the per capita total number of establishments in the municipality (panel A), the per capita number of sole proprietorships (panel B), the per capita number of incorporated private sector establishments (panel C), and the per capita number of public sector establishments (panel D). In columns 1 through 3, specifications include dependent and independent variables (law-implied Subsidy transfers) that are expressed in levels. In columns 4 through 6, variables are expressed in first differences. The specifications include municipality, county-year, and cutoff-year fixed effects and a first-order polynomial, as indicated, and is run for various bandwidths (i.e., 6%, 5%, and 4%, respectively).

The estimates are in line with prior visual inspections: both the number of total and sole proprietorships are found to increase (around the Subsidy thresholds), with all coefficients estimated to be positive and statistically significant, while the number of private and public establishments seem mostly unaffected. The former set of estimated coefficients is also economically relevant. For the first row in Table 2, panel A, columns 1 through 3 for example, with coefficients ranging from 0.271 to 0.439, compared to the mean of the dependent variable (which is 0.079 for total establishments per capita) implies that a one standard deviation increase in per capita Subsidy level results in a 7% to 12% increase in total establishments per capita (e.g., $12\% = 100*((0.439/0.079)*0.022)$), signifi-

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[27] The lack of discontinuity in municipal budget balance at the threshold is consistent with the lack of discontinuity in the municipal public debt expenses presented in panel D of Appendix Table A3.
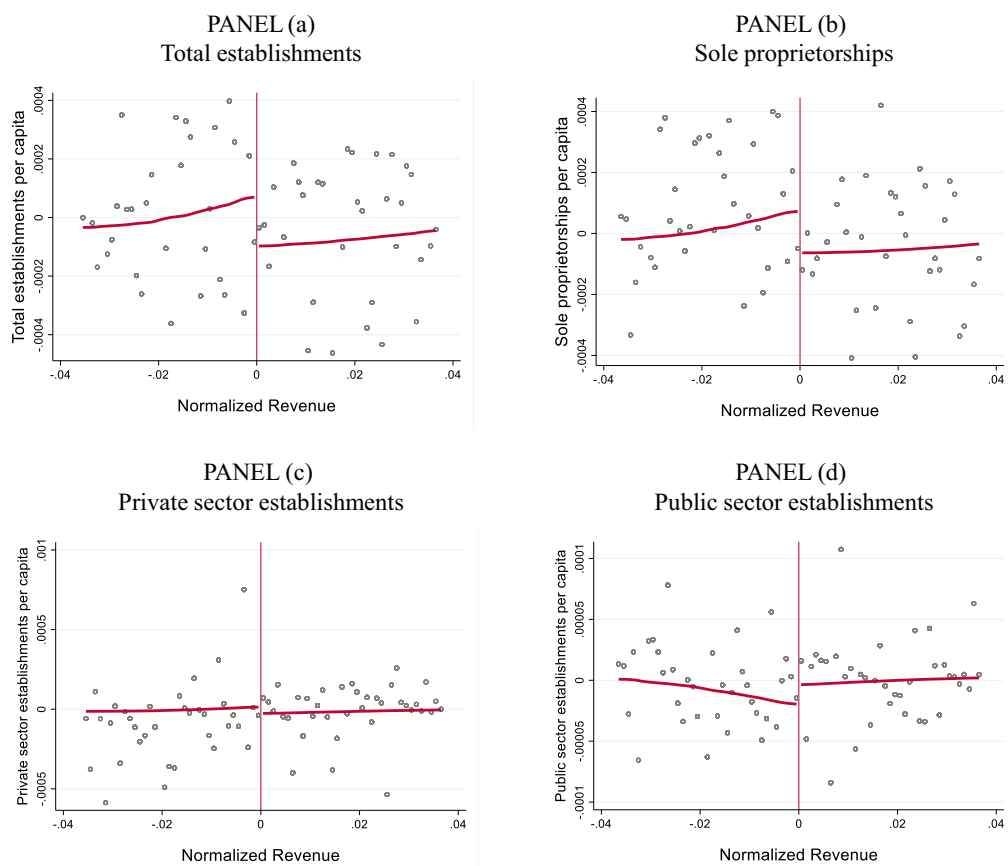
PANEL (a)
Total establishments

PANEL (b)
Sole proprietorships

PANEL (c)
Private sector establishments

PANEL (d)
Public sector establishments

**FIGURE 7**    Number of establishments around the cutoffs.

[Color figure can be viewed at wileyonlinelibrary.com]

*Notes*: This figure illustrates the impact of the drop in subsidy around the zero normalized revenue cutoff on the total number of establishments, sole proprietorships, and private and public sector establishments.

cantly exceeding the 2% average annual growth rate in the number of new businesses in the country. For an average municipality with approximately 1,000 operating firms and for a one standard deviation increase in Subsidy funding (i.e., 2 million PLN or 0.5 million USD), our estimates would suggest an increase of approximately 70 to 120 establishments or around 16,700 to 28,500 PLN (4,175 to 7,125 USD) per firm.[28,29]

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[28] To contextualize our estimates, consider that there are no administrative costs involved with opening a sole proprietorship in Poland. The administrative process requires submitting necessary documentation in an appropriate municipal office either in person or online. New business owners benefit from VAT tax relief if the revenue does not exceed 200,000 PLN (50,000 USD) per annum and reduced social security contributions, which for the first 24 months of business operation amount to less than 400 PLN (100 USD) per month in 2020. Specialist software available at low cost makes bookkeeping or reporting easy and cost-efficient. Business owners can choose to pay a fixed 19% income tax or a progressive income tax, which charges 17% for income up to approximately 85,000 PLN (21,000 USD), and 35% for the remaining amount. Other overheads include the costs of equipment which vary depending on the character of provided services and goods. In footnote 29, we list other deductions which business owners may benefit from. In addition consider that the 2 million PLN (0.5 million USD) of additional Subsidy is a sizable amount that can allow municipalities to, for example, cover: the annual cost of a full-time public nursery for approximately 400 children (considering a monthly fee of 400 PLN or 100 USD per child); refurbish 10 to 20 education institutions buildings (estimated at 100,000 to 200,000 PLN or 25,000 to 50,000 USD each); purchase and install approximately 250 street lamps (8,000 PLN or 2,000 USD each), or about 1,600 benches (costing 1,200 PLN or 300 USD each); or build 8,000 square meters of local roads in an urban area (250 PLN or 100 USD per m$^2$).

[29] Consistent with findings in Appendix Figure A5, we document in Appendix Table A8 a positive effect of the Subsidy transfers separately at each cutoff, although statistically this effect is significant mainly at cutoff 1 and cutoff 2. Lack of consistently statistically significant estimates at

**TABLE 2**  Number of establishments and fiscal transfers.

| Local estimates | in levels | | | in first differences | | |
|---|---|---|---|---|---|---|
| Bandwidth | <6% | <5% | <4% | <6% | <5% | <4% |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| **Panel A - Total establishments per capita** | | | | | | |
| OLS | 0.271*** | 0.321*** | 0.439*** | 0.093* | 0.156** | 0.186** |
| | (0.066) | (0.087) | (0.111) | (0.048) | (0.066) | (0.087) |
| Fuzzy RD (IV) | 0.280*** | 0.346*** | 0.507*** | 0.102* | 0.190** | 0.269** |
| | (0.067) | (0.089) | (0.114) | (0.054) | (0.082) | (0.120) |
| **Panel B - Sole proprietorships per capita** | | | | | | |
| OLS | 0.342*** | 0.392*** | 0.468*** | 0.102** | 0.168*** | 0.209** |
| | (0.062) | (0.081) | (0.109) | (0.043) | (0.062) | (0.086) |
| Fuzzy RD (IV) | 0.354*** | 0.423*** | 0.541*** | 0.112** | 0.204*** | 0.302*** |
| | (0.063) | (0.081) | (0.109) | (0.048) | (0.076) | (0.112) |
| **Panel C - Private sector establishments per capita** | | | | | | |
| OLS | -0.061*** | -0.058** | -0.034 | -0.015 | -0.025 | -0.038 |
| | (0.022) | (0.024) | (0.028) | (0.016) | (0.022) | (0.028) |
| Fuzzy RD (IV) | -0.063*** | -0.063** | -0.040 | -0.017 | -0.030 | -0.054 |
| | (0.023) | (0.025) | (0.031) | (0.017) | (0.026) | (0.038) |
| **Panel D - Public sector establishments per capita** | | | | | | |
| OLS | -0.002 | -0.007 | 0.006 | 0.010 | 0.016 | 0.020 |
| | (0.007) | (0.010) | (0.013) | (0.007) | (0.011) | (0.015) |
| Fuzzy RD (IV) | -0.002 | -0.008 | 0.007 | 0.011 | 0.019 | 0.028 |
| | (0.008) | (0.011) | (0.015) | (0.008) | (0.013) | (0.021) |
| Observations | 3,202 | 2,294 | 1,475 | 1,522 | 989 | 581 |
| Municipality FE | YES | YES | YES | NO | NO | NO |
| County-year FE | YES | YES | YES | YES | YES | YES |
| Cutoff-year FE | YES | YES | YES | YES | YES | YES |
| First-order polynomial | YES | YES | YES | YES | YES | YES |

*Notes*: The table reports OLS and fuzzy-RD coefficients and heteroscedasticity-adjusted standard errors clustered at the municipality level (in parentheses). Regressions examine the entrepreneurial effects of *Subsidy* transfers. Dependent variables include per capita number of all establishments in the municipality (Panel A), per capita number of sole proprietorships (Panel B), per capita number of incorporated private sector establishments (Panel C), and per capita number of public sector establishments (Panel D). In Columns 1 through 3, specifications include dependent and independent variables (law-implied *Subsidy* transfers) that are expressed in levels. In Columns 4 through 6, variables are expressed in first differences. "Yes" indicates that the set of fixed effects and first-order polynomial is included. "No" indicates that the set of fixed effects is not included. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Even if all firms employ only one person, the cost per job would be discernibly lower than the cost estimated in Corbi et al. (2019) for Brazil, which equals 8,000 USD per job. We show below that no or very few firms are created by migrants (from other municipalities) or by locally unemployed persons,

cutoff 3 could result from the fact that the sample of municipalities at this threshold is comprised of only rural municipalities. In unreported tests, we find that although Subsidy transfers spur entrepreneurship in both urban and rural municipalities, the magnitude and statistical significance of this effect is stronger in urban municipalities. Appendix Table A9 documents a reduction in municipal expenditures for public administration and an increase on other expenses at each cutoff, further supporting the notion that by boosting municipal expenditure, fiscal transfers lead to increased firm formation.

**TABLE 3**   Opened and closed establishments.

| Dependent variable | Opened establishments | Closed establishments |
|---|---|---|
| | (1) | (2) |
| Fuzzy RD (IV) | 0.109*** | 0.055* |
| | (0.031) | (0.031) |
| Observations | 2,681 | 2,681 |
| Municipality FE | YES | YES |
| County-year FE | YES | YES |
| Cutoff-year FE | YES | YES |
| First-order polynomial | YES | YES |

*Notes*: The table reports fuzzy-RD coefficients and heteroscedasticity-adjusted standard errors clustered at the municipality level (in parentheses). Regressions examine the entrepreneurial effects of *Subsidy* transfers. Dependent variables include per capita number of all newly opened (Column 1) and closed (Column 2) establishments in the municipality. "Yes" indicates that the set of fixed effects and first-order polynomial is included. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

but by employees of locally existing companies. This would imply that the costs of training may be lower. We also conjecture that the effective use of governmental funds may be higher in Poland than in Brazil,[30] a dimension we return to when we investigate the impact of the characteristics of municipal councils on firm creation.

The results presented in Table 2 document a positive effect of fiscal transfers on entrepreneurial activities, which we interpret as a positive effect on firm creation. However, the effect of an increase in the net number of firms may be a result of either an increase in the number of newly established sole proprietorships or due to the reduction in existing businesses. To provide a support for our interpretation we re-estimate our results using the National Official Business Register (REGON) data, which allows us to distinguish between newly opened and recently closed firms. The results presented in Table 3, column 1 documents a statistically significant increase in the number of newly opened firms. Although in column 2 we also observe a positive effect on firm closures, the magnitude of this effect is much lower. For brevity, in Table 3 and all remaining tables, we report only the results for local estimates in levels and 6% bandwidth.[31,32]

## The duration of the entrepreneurial effects

In this section we estimate the duration of the effects found in Tables 2 and 3. In Table 4 we test whether the Subsidy transferred in a given year and previous years keep stimulating firms' creation. Estimates document the positive and statistically significant effect of Subsidy on total number of firms only in the year of the transfer. We do not find the transfers received by municipalities in the 2 previous years to have a significant effect on the firm formation in the current year.

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[30] For example, in the 2019 country ranking based on The Corruption Perceptions Index (CPI) published annually by the Berlin-based Transparency International (2020), Poland is ranked 41st while Brazil is ranked only 105th, hence it is perceived to be substantially more corrupt and among other things less effective in allocating governmental funds than Poland.

[31] In the majority of cases, estimates in first-differences are consistent with the ones reported there.

[32] The REGON database, although providing crucial information on firm formation is subject to limitations. Although this database is supposed to include data on all businesses operating in Poland there is a possibility that for certain firms the information on the ownership type or firm address will be missing. As such, our preferred source of information comes from Statistics Poland on which our baseline estimates in Table 2 are based. This information is not subject to the same limitation.

**TABLE 4**  Dynamic effects.

| Dependent variable | Total establishments |
| --- | --- |
| Subsidy $_t$ | 0.302*** |
| | (0.074) |
| Subsidy $_{t-1}$ | -0.004 |
| | (0.014) |
| Subsidy $_{t-2}$ | -0.008 |
| | (0.013) |
| Observations | 2,255 |
| Municipality FE | YES |
| County-year FE | YES |
| Cutoff-year FE | YES |
| First-order polynomial | YES |

*Notes*: The table reports fuzzy-RD coefficients and heteroscedasticity-adjusted standard errors clustered at the municipality level (in parentheses). Regressions examine the dynamics of the entrepreneurial effects of *Subsidy* transfers. Dependent variable is per capita number of all establishments in the municipality. "Yes" indicates that the set of fixed effects and first-order polynomial is included. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

## Fiscal transfers effect by the size and industry of establishments

In Table 5 panel A, we re-estimate the results in Table 2, differentiating by establishments' size. We find that the positive effects presented in Table 2 are driven solely by increases in establishments with up to 9 employees.[33] The remaining coefficients in panel A are statistically indistinguishable from zero. This is not surprising given that sole proprietorships in this size bracket constitute the majority of establishments in our sample.

Panel B of Table 5 examines the effect of local government funding on the number of firms in different sectors. We find a significant increase in the number of establishments and in the construction, financial, manufacturing, services, and retail industry. Our estimates also suggest that these positive effects come at the expense of a reduced number of establishments in the farming, real estate, and, somewhat surprisingly, IT industries. In unreported tests, we do not find any significant differences in the number of firms from the following industries: culture, education, electricity, healthcare, hospitality, mining, plumbing, science, and transportation. So overall, these estimates suggest short-term local government funding may spur entrepreneurship in certain easy-to-start sectors (where entry barriers are low),[34] but may not assist much in expanding the local high-tech sector which may grow the local employment base and increase local per capita income more than other sectors (e.g., Storper et al., 2015).

## THE MECHANISM OF IMPACT AND ADDITIONAL ECONOMIC EFFECTS

In this section, we present a set of results uncovering potential mechanisms behind the entrepreneurial effects of fiscal transfers as well as discuss other important economic effects resulting from the

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[33] A firm in Poland held by a sole proprietor can employ multiple employees. Private companies are most often held by multiple proprietors and also can employ multiple employees.

[34] For instance, easy-to-start businesses could include sole proprietorships providing financial advice and insurance brokerage services in the financial sector; or sole proprietorships offering tailoring, printing, installation, repair, and maintenance of machinery and electrical equipment, which belong to the manufacturing sector.

**TABLE 5**  Number of establishments and fiscal transfers by size and industry.

| Panel A - Total number of establishments and fiscal transfers by size | | | |
|---|---|---|---|
| Establishment size: | 1-9 | 10-49 | 50+ |
| Fuzzy RD (IV) | 0.275*** | 0.005 | 0.000 |
|  | (0.067) | (0.006) | (0.002) |
| Observations | 3,202 | 3,202 | 3,202 |
| Municipality FE | YES | YES | YES |
| County-year FE | YES | YES | YES |
| Cutoff-year FE | YES | YES | YES |
| First-order polynomial | YES | YES | YES |

| Panel B - Total number of establishments and fiscal transfers by industry | | | |
|---|---|---|---|
| Industry: | Construction | Farming | Financial | IT |
| Fuzzy RD (IV) | 0.106*** | -0.050*** | 0.019*** | -0.026*** |
|  | (0.029) | (0.013) | (0.007) | (0.006) |
| Industry: | Services | Manufacturing | Real Estate | Retail |
| Fuzzy RD (IV) | 0.032** | 0.087*** | -0.048*** | 0.161*** |
|  | (0.013) | (0.018) | (0.014) | (0.028) |
| Observations | 3,202 | 3,202 | 3,202 | 3,202 |
| Municipality FE | YES | YES | YES | YES |
| County-year FE | YES | YES | YES | YES |
| Cutoff-year FE | YES | YES | YES | YES |
| First-order polynomial | YES | YES | YES | YES |

*Notes*: The table reports fuzzy-RD coefficients and heteroscedasticity-adjusted standard errors clustered at the municipality level (in parentheses). Regressions examine the effect of *Subsidy* transfers on the per capita number of establishments by the size of businesses (Panel A) and by the industry of the business (Panel B). In Panel A, we consider businesses with up to 9 employees, between 10 to 49 employees, and with 50 or more employees. In Panel B, the dependent variable is the per capita number of all establishments in the following industries: Construction, Farming, Finance, IT, Services, Manufacturing, Real estate, and Retail. "Yes" indicates that the set of fixed effects and first-order polynomial is included. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

firm formation. We begin by examining in detail the effect of additional Subsidy transfers on local government expenditure. Next we test the effect of fiscal transfers on municipal migration patterns. Finally, we document the impact of fiscal transfers on unemployment rates, average wages, and patent applications.

## Local government spending

In the section "Preliminary Tests," we document that an increase in the fiscal transfers received by municipalities boosts their expenditure on non-public administration items. Here, we look more closely at which municipal expenses not related to public administration expenses increase following receivership of higher Subsidy transfers and are likely to explain the growth in the number of businesses.

Following Bania and Stone (2008), we group municipal expenditures into "Economically productive services and infrastructure" expenses and "Redistributive and consumption-oriented" expenses. The former classification includes expenditures on services, provision of utilities, farming, forestry, fishery, education, culture, transportation, public safety, environment and housing, public

**TABLE 6** Entrepreneurial effects mechanism.

| Dependent variable | Economically productive services and infrastructure (1) | Redistributive and consumption-oriented (2) |
|---|---|---|
| Fuzzy RD (IV) | 0.035 | 0.676*** |
| | (0.818) | (0.188) |
| Observations | 3,202 | 3,202 |
| Municipality FE | YES | YES |
| County-year FE | YES | YES |
| Cutoff-year FE | YES | YES |
| First-order polynomial | YES | YES |

*Notes*: The table reports fuzzy-RD coefficients and heteroscedasticity-adjusted standard errors clustered at the municipality level (in parentheses). Regressions examine the effect of *Subsidy* transfers on municipal expenditure. Dependent variables include per capita municipal expenses on Economically productive services and infrastructure (Column 1) and Redistributive and consumption-oriented expenses (Column 2). "Yes" indicates that the set of fixed effects and first-order polynomial is included. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

administration, interest expenditures, and other expenditures. The latter group includes spending on public welfare, hospitals, health, social insurance administration, and veterans' services.

Table 6 reports the results. We find a positive and statistically significant effect of Subsidy transfers only on redistributive and consumption-oriented expenses (column 2). The effect on economically productive services and infrastructure is statistically insignificant (column 1). However, expenditure in each individual category includes funding devoted to obtaining products and services provided by businesses, investments in infrastructure (development and maintenance), and donations and/or subsidies provided by municipal councils to firms or individuals. As such, even consumption-oriented expenses could potentially be classified as economically productive. To better understand exactly which expenditure is affected in Appendix Table A10, we provide results of regressions associating various detailed per capita municipal expenses to per capita Subsidy transfers.[35] We find a consistent and statistically significant increase only in the case of expenses on social assistance (panel I).[36]

How should we interpret these results? Can increased expenses on social assistance explain an increase in the number of sole proprietorships in the construction, manufacturing, or retail industry? One could infer that the lack of statistically significant effect on expenses in the manufacturing sector is inconsistent with the results presented in Table 5 panel B, where we find a significant increase in the number of manufacturing sector sole proprietorships. However, expenses on social assistance programs may include various cash and in-kind benefits to vulnerable individuals and families, disabled individuals, and the unemployed; costs of training programs aimed at professional upgrading of individuals; expenses on social assistance infrastructure such as the development and maintenance of day-care centers, nursing homes, and other social care buildings; or expenses on the provision of care services.[37] As such, cash transfers may alleviate individuals' resource constraints, allowing them to set up businesses, while in-kind benefits may also create demand for retail and manufacturing industry services and products. Training programs can provide individuals with the information and skills

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[35] Detailed information on exact expenses in each category are available on the website of the Online Database of Polish Legislation (Dz.U. 2010 nr 38 poz. 207).

[36] We also find a consistent increase in expenses on agriculture, forestry, and fishing (panel A), manufacturing (panel E), housing provision (panel F), and development and maintenance of utility supply (panel K). However, these effects lack statistical significance. Adverse effects are observed among municipal expenses on health care (panel C) and recreation, tourism, and culture (panel G). However, none of these results are consistently statistically significant. Coefficients on remaining expenses, education (panel B), IT infrastructure (panel D), services (panel H), maintenance and development of transportation infrastructure (panel J), and all other expenses (panel L) also lack statistical significance and often provide inconsistent results at different bandwidths.

[37] Unfortunately, our data do not allow us to explore the Subsidy effects on these subcategories of social assistance expenditures.

**TABLE 7**  Fiscal transfers, migration, unemployment, wages and patent applications.

| Dependent variable | Migration | Unemployment | | | Wages | | Patents | |
|---|---|---|---|---|---|---|---|---|
| | Net | Total | Women | Men | Private sector | Public sector | Total | Private sector |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Fuzzy RD (IV) | 0.080 | -2.772 | -5.349** | -0.495 | 5.450** | -1.831 | 0.003 | 0.004* |
| | (0.077) | (1.715) | (2.208) | (1.907) | (2.342) | (1.161) | (0.002) | (0.002) |
| Observations | 2,589 | 3,202 | 3,202 | 3,202 | 2,772 | 2,772 | 3,202 | 3,202 |
| Municipality FE | YES | YES | YES | YES | YES | YES | YES | YES |
| County-year FE | YES | YES | YES | YES | YES | YES | YES | YES |
| Cutoff-year FE | YES | YES | YES | YES | YES | YES | YES | YES |
| First-order polynomial | YES | YES | YES | YES | YES | YES | YES | YES |

*Notes*: The table reports fuzzy-RD coefficients and heteroscedasticity-adjusted standard errors clustered at the municipality level (in parentheses). Regressions associate law-implied *Subsidy* transfers to: per capita net migration (Column 1); total municipal unemployment rates (Column 2), unemployment rates among women (Column 3) and men (Column 4); the average wage in the private sector (Column 5) and the public sector (Column 6); per capita number of all patent applications (Column 7); and private sector patent applications excluding those submitted by higher education institutions or science institutes (Column 8). "Yes" indicates that the set of fixed effects and first-order polynomial is included. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

necessary to establish and operate their businesses and/or change profession (e.g., O'Connor, 2013). The development and maintenance of social assistance infrastructure may increase the demand for services provided by the construction and manufacturing sector firms. Municipal expenses on care services may not only boost the demand for services offered by professionals in this industry but may also alleviate time constraints for potential entrepreneurs, for example, single parents.

In sum, it is plausible that the mechanism behind the results documented in Table 2 is an increase in the expenditure on social assistance resulting from higher fiscal transfers received by municipalities.

## Migration patterns

An increase in the number of establishments triggered by additional level of Subsidy funding may be driven by existing residents and/or new residents opening new businesses in the municipality. Alternatively, new residents may relocate their existing proprietorships from other municipalities. Firm formation resulting from migration and business relocation may result in a sort of "overestimation" of the salutary effect of the Subsidy, as subsidized municipalities attract business from elsewhere in a form of Subsidy competition that has no net positive effect at the more aggregated level.[38]

In Table 7 we test whether migration is likely to explain the entrepreneurial effect of the fiscal transfers. The coefficient in column 1 suggests this is not the case. We do not find any statistically nor economically significant effect of local government spending on per capita net migration, suggesting that entrepreneurial effects of fiscal transfers are driven by existing municipalities' pool of residents.[39] This is consistent with the notion that many sole proprietors operate in close proximity to their long-term residence, as this allows them to benefit from personal connections to their potential clients, better understand local market conditions, and reduce overheads, as discussed in the introduction section.[40]

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[38] Indeed, if individuals relocate their businesses between municipalities, our estimates may simultaneously capture an increase in the number of firms in municipalities to which migrants are moving in and a decrease in the number of firms in municipalities from which they are relocating. This may inflate our estimates but in essence the Subsidy would result in a zero net economic effect at a more aggregated level.

[39] In unreported tests we verify that net migration patterns do not change in years preceding the distribution of Subsidy funding. Although it is highly unlikely that individuals could predict changes in the level of fiscal transfers, they may respond to changes in municipal tax revenues.

[40] In addition, the results presented in Appendix Table A11 document the lack of a significant effect of fiscal transfers on municipalities' total population. Given that variables are expressed in per capita values, these tests refute the possibility that the number of residents in municipalities could affect our estimates.

# Unemployment

Given that an influx of new residents is unlikely to explain the positive effect of local government spending on the number of firms, it is important to determine if new businesses are likely to be established by currently employed or unemployed individuals. Consequently, such estimates will allow us to verify the additional economic benefits stemming from fiscal transfers.

In columns 2 through 4 of Table 7, we associate municipal unemployment rates to per capita Subsidy funding. The negative coefficient presented in column 1 suggests that fiscal transfers reduce unemployment, and some of the new businesses are likely to be established by unemployed individuals. The coefficient of $-2.772$, which, compared to the mean of the dependent variable of 7.64%, implies that a one standard deviation increase in the per capita Subsidy level results in a 0.8% decrease in the unemployment rate or five locally unemployed individuals finding employment. Even if all of these unemployed residents establish a new business, this effect cannot explain the entry of between 70 to 120 new companies documented in Table 2. Therefore, the magnitude of the unemployment effect is consistent with many new businesses being created by employees leaving existing wage employment or hybrid entrepreneurs who share their existing employment while simultaneously entering self-employment (Folta et al., 2009).

Our data also allow us to examine the different unemployment rates by gender. In column 3 of Table 7 we find that the positive effect of fiscal transfers on employment is driven by reduction in unemployed women. Conversely, significantly lower magnitude of estimates presented in column 4 suggest that Subsidy funds do not help alleviating unemployment among men.

These results suggest that women are likely to benefit more from increased local government spending, either because they are enabled to create new establishments or find employment in newly established firms. These results are not surprising given that the unemployment rate among Polish women during the sample period is on average 2 percentage points (pp) higher compared to men. In addition, higher expenditure on social security by municipalities receiving higher Subsidy transfers is also likely to benefit women more as these funds often are allocated to reduce childcare costs. The level of this funding is likely to be much higher for unemployed women, single parents, or parents in more difficult financial situations.

Does this mean that men do not benefit from fiscal transfers? Not necessarily so. In Table 5 we find significant changes in the number of sole proprietorships in industries that are predominantly occupied by men, in particular the construction sector. Together with the unemployment results, this suggests that new businesses are also likely to be formed by men leaving their existing employment.

# Wages

Decreased unemployment, as well as the potential relocation of workforce from incorporated businesses to sole proprietorships associated with increased entrepreneurship, is likely to put pressure on the extant private sector employers. To recruit new or retain existing employees, management may be forced to increase wages. In our setting this is more likely to take place in sectors experiencing significant increases in sole proprietorships.

To test this hypothesis, we procure a proprietary dataset covering average monthly wages in incorporated private and public sector firms, as well as wages in various other industries.[41] Columns 5 through 6 of Table 7 present the results obtained by associating wages to the Subsidy funding. We find wages in the private sector firms increasing around the Subsidy thresholds (column 5). The estimated coefficient of 5.450 implies an increase in the average monthly wage of approximately 14%, or 400 in local currency PLN (approximately 100 USD). On the contrary wages in the public sector seem to fall (column 2).

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[41] Unfortunately, this dataset does not include information on average wages earned by sole proprietors.

## Patent applications

The final part of this section considers whether the formation of new businesses associated with the higher volume of fiscal transfers contributes to the development of innovative products. One could infer that the lack of positive effects on IT sector firms, which we document in section "Baseline Results," implies little or no technological progress. However, many patent applications submitted by individuals in Poland relate to products developed by individuals operating in the manufacturing or construction sectors.[42]

To formally test whether fiscal transfers lead to product innovation, we obtained patent applications records provided by the Polish Patent Office. This information allows us to distinguish between patent applications submitted in each municipality either on behalf of higher education institutions or private and national science institutes, or by individual inventors. In columns 7 and 8 of Table 7, we associate fiscal transfers to per capita patent applications. The presented coefficient suggests that fiscal transfers indeed do result in an increase in patent applications. However, this effect is mainly driven by applications submitted by individuals, as evident from coefficients in column 8, where the dependent variable does not include applications from higher education or science institutes.

Overall, the results presented in this section document important economic effects. By spurring entrepreneurial activity, fiscal transfers improve employability, particularly among unemployed women, spur wage growth, and lead to the development of innovative products.

## ENTREPRENEURIAL EFFECTS OF FISCAL TRANSFERS AND LOCAL GOVERNMENT CHARACTERISTICS

Whether and to what extent Subsidy transfers stimulate entrepreneurship ultimately depends on how local governments allocate funds across the real sector. As such, the characteristics of municipal councils may be a source of heterogeneity in our baseline results. The next set of tests investigates whether this heterogeneity arises from differences in municipal council accountability.

The political economy literature suggests that a better informed electorate and residents' ability to hold politicians accountable for their decisions significantly improves governments' responsiveness to society's needs (Besley & Burgess, 2002; Besley & Case, 1995; Strömberg, 2004). A higher degree of political competition through increased availability of information and a greater choice of candidates is assumed to improve political accountability and subsequently improve politicians' performance (Gagliarducci et al., 2011; Galasso & Nannicini, 2011), governmental efficiency (Wittman, 1989), and economic growth (Besley et al., 2010). We hypothesize that increased political competition and accountability at the local government level are important factors improving the efficient allocation of funding and result in a higher rate of entrepreneurship.

Alternatively, a low degree of political competition may reflect the high competencies of candidates representing one political party. Candidates who enter elections strategically and are faced with a low probability of winning the election (perhaps because competing candidates are highly competent) may refrain from running for office (Besley & Coate, 1997; Osborne & Slivinski, 1996). It is possible that particularly high-quality candidates may do so (Gordon et al., 2007; Jacobson, 1989; Maestas & Rugeley, 2008). If low political competition is a representation of council members' quality, then we could observe a stronger entrepreneurial effect of Subsidy funding in less politically contestable municipalities.

To test which of these two alternative hypotheses finds support in our data, we employ two measures: the share of the winning party members on municipal council and the median number of political

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[42] Examples of innovative products developed in the area of construction or manufacturing include heat engines (Patent application number: P.398333), solar engines (P.422588), wind turbines (P.399678), electrostatic air filters (P.423617), assistive devices for blind or disabled (P.427886), or construction equipment, e.g., innovative drills (P.427931).

parties represented on the council. The higher representation of political opposition (lower percentage of winning party members or higher number of political parties) indicates the availability of politicians or parties to choose from (political competition), and therefore the degree of local government accountability. In addition, a lower number of winning party members gauges stronger accountability by opposition council members, who are better informed about local government decisions and may provide more accurate information to the general public. An additional benefit of using higher party representation as a measure of government accountability is that it allows mitigating concern related to interest alignment among politicians in councils with a low number of political parties.[43]

Panel A of Table 8 presents the results for the sample split at the median share of winning party council members. We find a larger effect (in terms of LATE) of the Subsidy on the total number of firms in municipalities where political competition and accountability are stronger.[44] Column 1 presents the results for the full sample. The coefficient of 0.455 for a sample of municipalities where the share of winning party council members is below the median corresponds to, on average, an increase in total establishments by 14% following a one standard deviation increase in per capita Subsidy funding. Coefficient and corresponding economic magnitudes for a sample of municipalities where the share of winning party representatives is above the median value are substantially lower compared to specifications in column 1, implying an increase of 7.8% increase for total businesses in response to one standard deviation increase in per capita Subsidy transfer.

In column 2 we present the results for a matched sample. We match municipalities on their geographical location, assigning to each municipality on the left side of the threshold at least one municipality from the same county located on the right side of the threshold.[45] This procedure mitigates the concern that entrepreneurial opportunities may significantly differ between municipalities in each subsample. Although matching increases estimates for the sample of municipalities with above-median share of winning party council members, coefficients for the sample where political competition and accountability is more intense it is still considerably higher.

In panel B of Table 8, we compare the effect of Subsidy funding on entrepreneurship across municipalities below and above the median number of political parties represented in the local government. Again, we report results for full and matched samples. The magnitude of estimates suggests that fiscal transfers provide a stronger stimulus for entrepreneurial activity in municipalities with the number of parties above the median. Coefficients for fuzzy-RD of 0.361 suggests 12.8% increase in the number of establishments in municipalities where a higher number of political parties are being represented on municipal council. Municipalities with below median number of political parties in the council experience an increase of establishments of approximately 8.9%. Matching municipalities based on geographical location in Panel B yields results consistent with the full sample.

Overall, the results presented in Tables 8 are broadly not inconsistent with the notion that the ability to hold local government accountable can exert more substantial incentives for politicians to use any fiscal subsidies (at least in an economic sense) more effectively, which in turn boosts entrepreneurship.

## ADDITIONAL TESTS

Our analysis thus far documents a positive effect of fiscal transfers on entrepreneurship. We also uncover a significant heterogeneity in the magnitude of this effect, resulting from differences in political competition and local government accountability. In this section, we conduct several sensitivity tests to verify the robustness of our baseline estimates in Table 2.

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[43] This interest alignment can result in lower accountability and could exist despite the low share of winning party representatives in the council.

[44] Establishing the actual statistical significance of this differential is not straightforward in a fuzzy RDD context. We also only report results for local estimates in levels because the number of observations for estimates in first-differences for some subsamples is insufficient to perform the analysis. This is particularly problematic for estimations using matched sample in column 2.

[45] Municipalities on the left side of the threshold without a match on the right side exit the sample.

**TABLE 8** Local government composition and the entrepreneurial effects of fiscal transfers.

| Panel A - Winning party representation in the municipal council | | |
| --- | --- | --- |
| | **Full sample** | **Matched sample** |
| | **(1)** | **(2)** |
| RD: Winner members ≤ p50 | 0.455*** | 0.502*** |
| | (0.092) | (0.119) |
| LATE (%) | 14.10 | 15.40 |
| RD: Winner members > p50 | 0.249* | 0.406** |
| | (0.132) | (0.175) |
| LATE (%) | 7.76 | 12.76 |
| Observations: support ≤ p50 | 1,082 | 767 |
| Observations: support > p50 | 871 | 598 |
| Municipality FE | YES | YES |
| County-year FE | YES | YES |
| Cutoff-year FE | YES | YES |
| First-order polynomial | YES | YES |
| Panel B - Party representation on the municipal council | | |
| | **Full sample** | **Matched sample** |
| RD: # of parties > p50 | 0.361*** | 0.449*** |
| | (0.101) | (0.118) |
| LATE (%) | 12.81 | 14.70 |
| RD: # of parties ≤ p50 | 0.272*** | 0.378*** |
| | (0.102) | (0.134) |
| LATE (%) | 8.87 | 11.25 |
| Observations parties > p50 | 764 | 484 |
| Observations parties ≤ p50 | 1,216 | 851 |
| Municipality FE | YES | YES |
| County-year FE | YES | YES |
| Cutoff-year FE | YES | YES |
| First-order polynomial | YES | YES |

*Notes*: The table reports fuzzy-RD coefficients and heteroscedasticity-adjusted standard errors clustered at the municipality level (in parentheses). Regressions in Panel A examine heterogeneity in the effect of subsidy funding on entrepreneurship across municipalities below and above the median number of the winning party councillors sitting in the local government (*Winner member*). Regressions in Panel B examine heterogeneity in the effect of subsidy funding on entrepreneurship across municipalities below and above the median number of political parties represented in the local government (*# of parties*). Column 1 presents the results for the full sample, and Column 2 restricts the sample to municipalities on both sides of the threshold matched on geographical location (same county). "Yes" indicates that the set of fixed effects and first-order polynomial is included. LATE (%) represents the percentage change in per capita number of establishments in response to one standard deviation change in per capita Subsidy level. The economic magnitude is calculated by comparing local estimates to the mean value of the dependent variable of the subsample and the mean standard deviation. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

The results are presented in Appendix Table A12. First, we remove from our sample local government election years, 2014 and 2018. During an election year, politicians have stronger incentives to increase investment expenditure in order to gain the electorate (Nordhaus, 1975). As such, the entrepreneurial effects of fiscal transfers may be limited to these years. The results in panel A refute this idea. Obtained estimates for both establishments and sole proprietorships for non-election years are very similar to the baseline results.
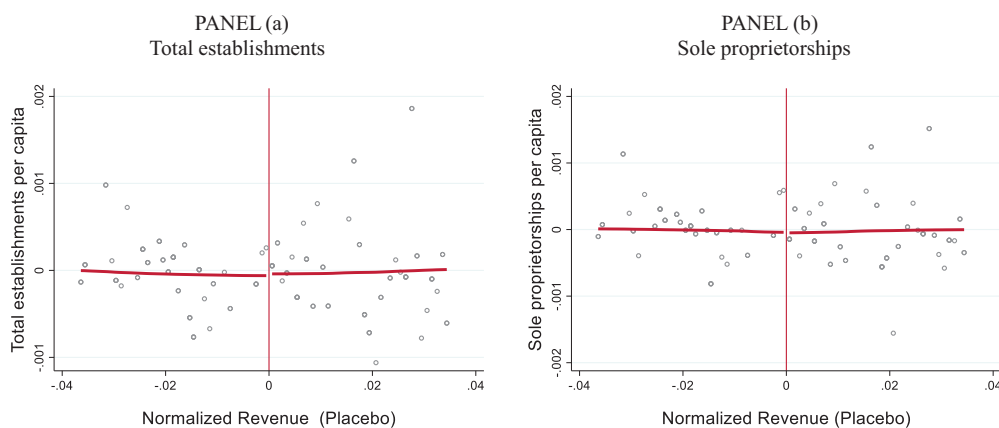
**FIGURE 8** Placebo tests.

[Color figure can be viewed at wileyonlinelibrary.com]

*Notes*: This figure illustrates the placebo tests results, testing for discontinuities in the total number of establishments and sole proprietorships for municipalities which normalized revenue lies below the zero value in years preceding contemporaneous thresholds.

Next, we revisit the regression discontinuity design assumption, requiring a lack of systematic manipulation of the threshold. As explained in section "Identification Strategy and Data," although such manipulation is unlikely to exist since it is difficult for municipalities to accurately estimate the reduction in revenue, which will be more than compensated by the Subsidy transfer, we provide a test examining whether baseline results are driven by municipalities that are more likely to manipulate the threshold. This test presented in panel B constrains the sample to municipalities which either do not change their Subsidy transfer status or move to a higher cutoff. Again, we do not find support for this hypothesis.

In panel C, we saturate specifications 2 through 4 with other sources of municipal revenue, which discontinuities we examine in Appendix Table A3. In panel D, we include a lag of the dependent variable to control for inertia. Specifications whose results are presented in panel E cluster standard errors at the county level. In panel F, we modify our specifications by including higher-order polynomials. In panel G, we re-estimate our results using specifications with alternative sets of fixed effects. We exclude cutoff-year and county-year fixed effects in columns 1 through 3, and in columns 4 through 6 we exclude all fixed effects. In all cases, the results confirm the robustness of the estimates presented in Table 2. In panel H we estimate our results using different bandwidths. Our sample includes municipalities within the 30%, 20%, and 10% bandwidths. The obtained coefficients remain positive and statistically significant.

Our final test aims to strengthen the validity of our RD design. We perform placebo tests looking at discontinuities in the total number of establishments and sole proprietorships in municipalities located around contemporaneous thresholds *(year t)* in years preceding the existence these thresholds *(t-n)*. In doing so we limit our sample to cutoff 1 and include in our analysis only municipalities which in years *t-n* did not receive any Subsidy funding, although they would be eligible to receive it in year *t*. The intuition behind this test is that if the increase in the number of newly formed businesses is to be associated with the level of Subsidy funding, we should not observe any discontinuity in the number of new firms around "placebo" thresholds. The results are presented in Figure 8 and show that the number of total establishments and sole proprietorships are continuous at these thresholds providing additional support to the validity of our analysis.

# CONCLUSION

Entrepreneurship has wide-ranging benefits for innovation, job creation, and development of the economy as a whole. A vast literature has both modelled and documented the impact of government purchases on economic activity. We contribute to this literature by employing a state-of-art methodology to estimate the impact of local subsidies on entrepreneurial dynamism, distinguishing by firm type, spending category, and municipality governance strength.

Specifically, in this paper, we investigate whether local government spending helps to stimulate entrepreneurial activity. To do so, we study Poland, where municipalities with lower tax revenues receive direct monetary grants from the national budget that vary at multiple pre-determined and non-manipulable thresholds. This institutional setting allows us to employ a fuzzy regression discontinuity design. In this way we get around a pernicious reverse causality problem as local governments may benefit and respond to local firm entry and growth by increasing spending (thereby generating further firm entry and growth).

We document the following key results. First, we find a positive impact of fiscal transfers on the number of firms. This effect is primarily driven by an increase in the number of sole proprietorships and small firms. Second, we document positive effect of transfers on employment and wages. Finally, we show that entrepreneurial effects are stronger in municipalities where the opposition is more involved in the legislative process or more parties are represented in the municipal council.

The channels through which government expenditures—increased by fiscal transfers—are likely to spur entrepreneurial activity is additional spending on social assistance. Cash and in-kind benefits may alleviate individuals' resource constraints, allowing them to set up businesses, while expenditure on social assistance infrastructure may increase the demand for services provided by the construction and manufacturing sector firms. Expenses on care, including day-care or nursing homes, may not only boost the demand for services offered by professionals in this industry but may also alleviate time constraints for potential entrepreneurs, for example, single parents. That the entrepreneurial effect is found not to be necessarily transitory suggests that even the temporary alleviation of this time constraint facilitates the creation of businesses that are successful also in the longer run. This finding implies that the municipal provision of social assistance services under the right conditions can be successful in fostering local firm creation.

Overall, our results highlight the beneficial role of government funding as a mechanism to alleviate entrepreneurial constraints. Local governments seem to respond well to the intergovernmental fiscal transfer program within the local context by adroitly employing the flexible and swift tool of social assistance spending, which may not only carry a positive entrepreneurial but also political impact. However, we do not think that based on our study one can necessarily claim that central government needs to incentivize local spending on social assistance services through more targeted transfer programs instead of through unconditional grants.

Our findings also offer important policy implications, cautioning against reforms which may weaken government accountability. One extension of our work is to explore how local education, social, and inequality conditions shape municipal spending and entrepreneurial dynamism. We leave this extension for future research.

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# SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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