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Micro-economic effects of public funds on enterprises in Hungary

Györgyi Nyikos ^a, Attila Béres^b and Tamás Laposa^c

ABSTRACT

To enhance the effectiveness of and return on public investments, using financial instruments in addition to grants has lately become an increasingly preferred policy instrument choice in Central and Eastern Europe. The paper examines the impact different financial tools bring about at a micro-level. This enables recommendations for policy-makers to be produced on the type of assistance that could be of best use to improve access to finance for micro-, small and medium-sized enterprises, and thus achieve long-term, sustainable economic growth. The analysis is based on counterfactual evaluation and difference-in-differences. The findings indicate that the use of European Union funds (both grants and financial instruments) has a beneficial influence on employment and sales. However, the results also illustrate that in order to achieve the goal of higher impact and certain productivity effects, subsidies should be allocated to the initially less productive small firms in the less developed regions. Another important outcome is that, to some extent, financing through financial instruments has more direct relevance to advanced productivity, and due to their revolving nature, they generate more positive impact on the Hungarian economy than do grants.

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Cohesion Policy; counterfactual evaluation; policy impact; grants; financial instruments

JEL CLASSIFICATIONS

D04; G38; H25; O22

INTRODUCTION

Micro-, small and medium-sized enterprises (MSMEs) play a major role in economic development. Entrepreneurship has been broadly recognized as a means of job creation, innovation and economic growth (e.g., Audretsch & Keilbach, 2004; Jurado & Battisti, 2019; Wong et al., 2005). Therefore, the availability of external finance for MSMEs occupies a high position on the agenda of policy-makers. Namely, the lack of it is seen as a barrier to business growth. MSMEs suffer from the existence of a structural lending gap, that is, some MSMEs are unable to raise bank financing at a reasonable interest rate, which negatively influences their economic performance (Beck et al., 2008; Kraemer-Eis et al., 2015).

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Besides private, also public sources and European Union (EU) funds (in the form of grants¹ of financial instruments – FIs²) are available to finance economic development tools. Reviews of the effects of EU funds (Pienkowski & Berkowitz, 2015) offer both a good oversight and a meta-analysis of the existing literature assessing EU Cohesion Policy. These studies have generally ‘found positive, although usually small impact of EU funds on regional growth, especially in less developed regions’ (Pienkowski & Berkowitz, 2015, p. 9). Other studies present no statistically significant impact of EU Cohesion Policy (Dall’erba & Le Gallo, 2008); neither do they reveal an impact conditional on the local context, depending on the country (Béres et al., 2019; Le Gallo et al., 2011) or the quality of institutions (Ederveen et al., 2006; Nyikos & Talaga, 2015). Many researchers have identified no impact or recognized highly disputable effects of MSME support from EU or national government policies (Edwards et al., 2007; Nightingale & Coad, 2014; Norrman & Bager-Sjögren, 2010; Tödtling-Schönhofer et al., 2011), whereas others articulated that the influence of rural development measures is rather close to zero or non-significant (Bakucs et al., 2018). As a summary, researches have acknowledged that the impact of Cohesion Policy is far from uniform; academic interest has shifted away from attempts to assess its ‘total impact’ towards an emphasis on the ‘conditioning factors’ that explain where, when and how policy is proven effective (Crowley, 2017; Fratesi & Wishlade, 2017; Morisson & Doussineau, 2019).

The long-standing pressures to deliver better results with the use of EU Cohesion Policy funds have been intensified in the current context of an economic austerity. EU Cohesion Policy is presently expected to achieve more tangible outcomes with fewer resources. This requires a stronger focus on the return on investment and sustainability of interventions, better strategic management as well as the employment of integrated and place-based approach (Dąbrowski, 2015; Hajdu et al., 2017). This transition has been matched by academic research showing cases of better performance for FIs than grants for firm support initiatives (e.g., Bondonio & Martini, 2012). FIs aim to increase the overall capital available by unlocking other public sector funding and private sector resources through co-financing and co-investment (Nyikos, 2016; Wishlade et al., 2019). The literature has also examined access to finance support measures such as grants and awards, loans with reduced interest rates, credit guarantees and support for research and development (R&D) (Dvoulty et al., 2019). It is important to note that the EU support schemes differ greatly in the various member states (Nyikos, 2013), consequentially different results may occur for MSME development measures depending on the type of programme and its implementation context (Potluka et al., 2010). Moreover, the effectiveness of interventions may also be contingent on the institutional environment (Bachtler et al., 2014; Charron & Lapuente, 2013; Ferry & Polverari, 2018; Rodríguez-Pose & Garcilazo, 2015; Smeriglio et al., 2016). A clear lesson from evaluations and studies is that FIs must be tailored to local needs and conditions (Michie & Wishlade, 2011; Musiałkowska & Idczak, 2018; Nyikos, 2017).

Streamlining public financial tools for the future programming period is still complicated as the literature on the effects of EU FIs at the micro-level is quite limited in Hungary (e.g., Banai et al., 2017a, 2017b; Béres, 2016; Béres & Závecz, 2016). In this research, when studying the impact of economic development policy, we looked beyond gross domestic product (GDP) and macroeconomic figures to examine the economic effects of the different sources at the micro-level. This paper is limited to a narrow set of sources, which have been financing MSMEs and economic development, and their impact on economic indicators.

THE HUNGARIAN CASE: BASELINE AND THE RESULTS OF MACROECONOMIC ANALYSES

Baseline situation: EU funds in Hungary

Since Hungary’s accession to the EU in 2004, the country has used significant EU funds³ to finance development programmes. Within the framework of the seven-year EU budget, one-

fifth of the annual Hungarian GDP was injected into the economy in the form of EU subsidies. Since 2010, sources have averaged around 5% of national income annually, which is by far the highest in the region. In fact, Hungary has benefitted from the second highest allocation of funds per capita (Nyikos & Soós, 2020). The Hungarian economy was able to show significant GDP growth of 4.6% in the period 2006–15; nevertheless, it lagged behind the region's growth leaders. Growth was driven by public investment, while private investment began to decline. In the programming period 2007–13 about €4 billion was allocated to enterprise support and innovation, equivalent to just over 18% of the total funding available. In the current programming period, Hungary has made extensive use of FIs providing support in the form of loans or venture capital (mainly under the JEREMIE programme) co-financed by the European Regional Development Fund (ERDF). The funding to FIs for enterprises amounts to €897 million (€762 million of which comes from the ERDF). Hence, in the absence of a developed capital market, EU funding represents one of the key funding instruments of the Hungarian MSME sector – besides bank loans and guarantees (Banai et al., 2017a).

Macroeconomic evaluation of the effect of Cohesion Funds in Hungary

The European Commission has published numerous studies to assess the impacts of EU funds, examining the effects of various schemes and periods employing a DSGE (dynamic stochastic general equilibrium modeling) model (e.g., Monfort et al., 2016; Roager et al., 2008; Varga & in't Veld, 2011). The model primarily looks at their impact on GDP: the findings broadly confirm the positive impact of subsidies (e.g., Monfort et al., 2016; Varga & in't Veld, 2011). Macroeconomic analyses call the additional demand produced in the economy during the year of grant project implementation as the demand effect, and the lasting effect of an increase in production efficiency as a supply effect. However, these effects are not limited to the project beneficiaries, but they form a chain on both the supply and demand sides. The short-term, demand-side effects of development policy in a given year are greater than the long-term effects. Nonetheless, towards the end of the programming period, cumulative supply effects from previous years' support may even reach the level of demand. Supply effects do not influence the sustained growth rate of the economy, but increase the level of GDP. In the absence of subsidies, the one-off effects of demand could even slow the economic growth rate for up to a year, as Hungary's experience reflected it in 2016.

EU funds are geared towards reinforcing social, economic and territorial cohesion in the long term and not in pure economic terms; also, several macroeconomic models attempt to measure an impact that was not an objective in the programmes. For many of the above-listed questions, which are linked to the economic effects, currently available methodologies do not offer a proper response. Therefore, measuring the financial and economic impact of Cohesion Policy can only be based on estimations. Adequately valuing the results of different schemes in a complex modelling framework creates many difficulties, too. Figure 1 shows the financial operations and the effects of economic development projects.

The studies and evaluations, which have examined the macroeconomic effects of EU funds on the Hungarian economy, illustrate different findings.

One perspective emphasizes that the growth of the Hungarian economy would have been significantly lower, instead of 4.5% only 1.8% without the EU subsidies (KPMG, 2017). Based on Quest III (a New Keynesian, dynamic equilibrium model), the European Commission estimates in 2016 suggested that by 2015 Hungary's GDP level had raised by 5.3% due to the implementation of the EU funds.

Another conclusion is that the increase in the expansion of the Hungarian economy would not have been significantly lower without the EU funds, considering their inefficiency. This opinion is mirrored in the impact evaluations of the Hungarian programmes prepared by the HÉTFA Research Institute (HÉTFA, 2015) using a macro-level approach: the HÉTFA-

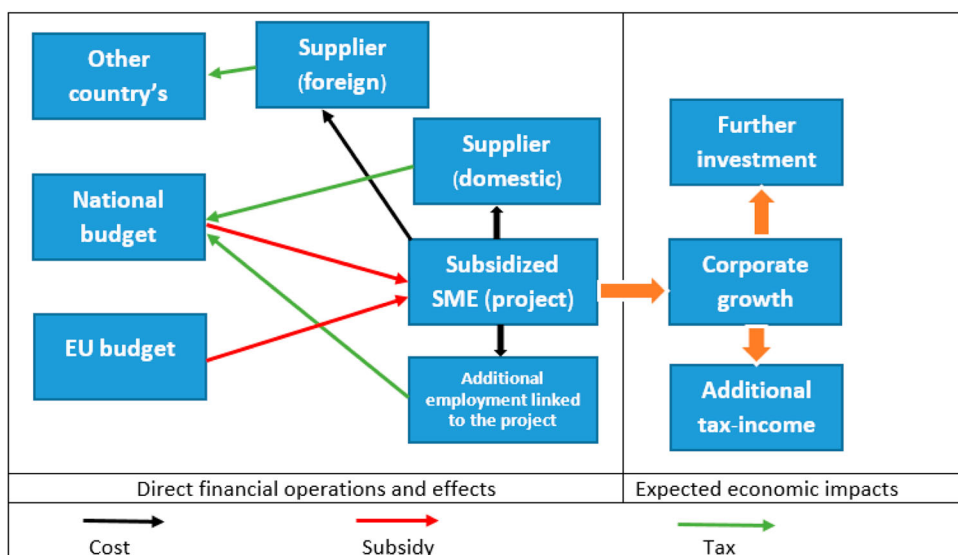


Figure 1. Financial operations and effects of economic development projects.

Source: Authors' compilation.

CGE model applied a multisectoral macroeconomic impact assessment model framework based on the calculated general equilibrium methodology, in line with the Hungarian Central Statistical Office Sectoral Relationship Matrix. The essence of the model is that it 'spreads' the effects of development sources to the economy through inter-sectoral productive relationships, thus integrating both spillover demand effects and rival crowding-out effects from intra- and inter-sector imbalances. According to the findings, although developments provided a short-run direct impulse to the Hungarian economy, they did not produce any long-term increase in capacity, or improvement in efficiency. At the end of the period, the level of GDP was nearly 2% higher than it would have been without subsidies. The assertion is that over a period of six years (2009–14), Hungary managed to squeeze out a 2% GDP growth surplus from 20% to 25% of annual GDP. That means an average of 0.3% a year.

Another illustrative approach (Oblath, 2016) is that the value of EU transfers is reflected in GDP. In this case, two contradictory effects are eliminated: (1) a part of the EU money will not be a domestic performance but an import; and (2) the multiplier effect of the money spending will increase the economic impact of transfers.

In another evaluation (Dedák, 2015), the net EU transfers work in macroeconomic terms in the same way as the fiscal stimulus, but without a budget deficit: there is demand-generating government expenditure, however, without income deduction appearing in the form of taxes. By filtering out EU funding, this method presents the smallest rate of GDP growth. Figure 2 shows the trend of Hungary's GDP between 2010 and 2015, together with the findings of the above-mentioned models.

The assessment of the budgetary impact constitutes another approach; however, it could vary depending on the following:

- How much the government would have invested in the absence of EU funds (almost impossible to estimate).
- How the various transfers between the national budget and the EU budget or between programming periods have evolved.

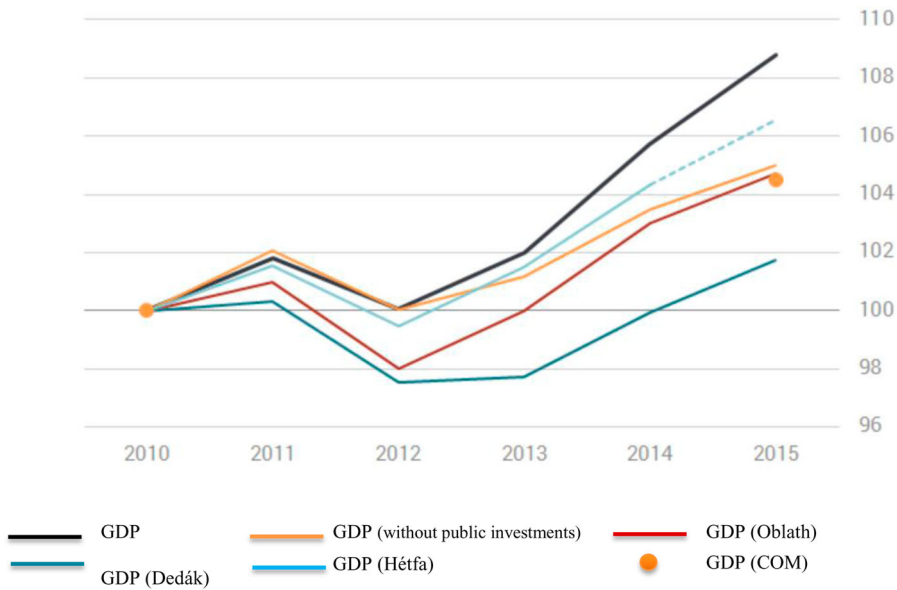


Figure 2. Gross domestic product (GDP) trend and paths according to different models.

Source: Internet journal *Portfolió* (12 October 2016) <https://www.portfolio.hu/>.

- The size of the operational programmes, their co-financing rate and the proportion of own contribution required from project promoters.
- The size of the tax implications that generate additional revenue for the national budget.
- How the exchange rate changed during the programming period (as the EU funds are defined in euros and disbursed in Hungarian forints (HUF) in Hungary).
- The basis for co-financing (public cost versus total cost).
- The location of purchases by beneficiaries during the project implementation (inland or abroad).

Based on the simplest logic, the financial effects could be calculated as follows. For the period 2007–13, the EU transfers – without transfers of the previous period – amounted to €15.135 billion (HUF4276 billion converted at yearly exchange rates). In the same period, a payment of HUF5778 billion for the projects was accounted for, resulting in a net budgetary impact of HUF1180 billion (additional tax revenues minus the national co-financing obligation): $5778/4276 = 1.35$. It means that the national co-financing and the beneficiary's own resources, respectively, added approximately 35% to the value of the investment compared with the value of the EU grants alone. As regards the budgetary impact, $1180/5778 = 0.2$, equality means that an investment of HUF100 from Cohesion Policy funds results in an average budget revenue of approximately HUF20. Meanwhile, in the period 2004–17, Hungary transferred HUF3217 billion as a member state contribution to the EU budget.

However, in this logic, economic development generates the lowest tax effect; due to the high value added tax (VAT) rate in Hungary (27%), non-VAT-claiming organizations in the public sector carry most of the tax effect. Meanwhile for-profit organizations reclaim their VAT expenses from the budget and thus have a minimum or marginal fiscal effect. From a short-term budgetary point of view, public investments generate significant revenue due to the significant VAT implications of the investment and the personal income tax (PIT) implications for European Social Fund (ESF)-type developments.

Consequently, while public sector support for the private sector is considered to generate certain long-term development, support for public sector investment immediately returns in the form of a tax, worth almost one third of the investment. This aspect inspires to undertake a micro-level analysis as well to explore whether this long-term economic impact of MSME support really exists.

AN EMPIRICAL ANALYSIS OF THE ECONOMIC EFFECTS OF DIFFERENT FINANCES AT THE MICRO-LEVEL

Database

The database used is a panel with firm-years constituting the units of analysis. It consists of 2.8 million rows covering all taxpaying Hungarian firms with double-entry bookkeeping (including 530,000 companies with at least one year of operation) between 2008 and 2016 (nine years or fewer for each company).

The variables contain firm-level characteristics, yearly aggregated information on EU subsidies: grants and FIs received by the firms. The examined calls for proposals for the 2007–13 (with $N + 2$ until 2015) programming period can be classified into four categories according to the objectives and nature of funding: categories I and II comprise calls offering grants, while categories III and IV focus on FIs. [Table 1](#) summarizes the objectives and the supported activities of the calls.

The above calls provided funds for small and medium-sized enterprises (SMEs) primarily. [Table 2](#) presents the funding opportunities for further target groups.

Data sources included the EMIR (Unified Monitoring Information System; grants), MFB (Hungarian Development Bank; FIs) and NAV (National Tax and Customs Administration; balance sheets for firms).

For the analysis, we used a subpopulation after filtering for companies with an average yearly employment size between 1 and 249, with an average yearly sales volume > 0 and $< \text{HUF}15.5$ billion and with an average yearly balance sheet size > 0 and $< \text{HUF}13.3$ billion. In addition, we excluded outliers in employment growth and sales growth within the subsidized firms by deleting the observations of < 1 st and > 99 th percentiles in these two growth variables.

The number of projects analysed was 5687; these projects belonged to 5118 beneficiaries (some beneficiaries had more than one subsidized project).

METHODS

The analyses were undertaken by using propensity score matching. In the first step, we coded the treatment variable to have a value of 1 if a company:

- received grants from EU funds (from the Economic Development Operational Programme (EDOP) or from the Regional Development Operational Programmes (RDOP));
- received funding from FIs under EDOP 4.1 or under the Central Hungary Operational Programme (CHOP) 1.3.1. in the 2007–13 programming period.

We concentrated on those beneficiary companies that received only one type of subsidy (either a grant or an FI) in one year during our four years' impact period (t). We defined the impact period between $t - 1$ and $t + 2$, (where t stands for the year of the signature of the support contract) and we measured the impact as the change of the variables in focus (employment, income and productivity) between $t - 1$ and $t + 2$. We did not take into account of firms receiving more than one subsidy in the impact period, except if it received the same type of subsidy in year t , because it would have unnecessarily complicated the analyses, blurred our identification without a

Table 1. Overview of the examined calls (supported activities).

Categories	Objectives	Supported activities
I	Employment and business infrastructure development	Development of industrial parks Incubation houses Brownfield investments Business site development Service development
	Technological development	Improvement of applied technologies Improvement of productivity Application of new information technology (IT) solutions
II	Business efficiency	Consulting Business process development
	Research, development and innovation (R&D&I)	Research infrastructure development Cooperation of business partners Product, service and technology development Launching of new products, services and technologies
	Clusters	Cooperation of education, research institutes and businesses
	Improvement of business environment	Development of logistics centres Development of IT support centres Knowledge-intensive supplier sector development Improvement of market position of small and medium-sized enterprises (SMEs)
III	Loan programme – tangible assets	Extension of business activities IT development, procurement of software and hardware Investment in tangible assets
IV	Loan programme – current assets	Extension of business activities Finance of current assets

Source: Authors' compilation of data from www.palyazat.gov.hu.

marked gain in sample size. Finally, we worked with 5118 companies as treated (subsidized) in the final filtered dataset (2% of the total filtered firm population).

In the second step, we selected controls for our treated companies. We limited our selection to those firms that never received any of the EU subsidies that our treatments did in the treatment period. The total number of potential control firms equalled 622,000 firms. It is worth mentioning that despite there being major differences between the potential control and the treated groups, with the propensity score matching (described below), we selected – from the potential controls – similar firms to the treated ones.

Out of these potential controls, we chose those that were similar to our variables of interest: employment, sales, balance sheet size; employment growth, sales growth, and balance sheet size growth (from $t - 2$ to $t - 1$); region (capital region versus the less developed regions) and sector (manufacturing versus other). The matching was performed on the $t - 1$ year data (Table 3), and we performed a one-to-one nearest-neighbour matching.

In Table 4, the columns show the means in certain variables for the matched control and the treated groups. The last column represents the mean difference between the treated and matched controls. Two-sample t -tests (Welch's t -test assuming unequal variance) were used for hypothesis testing (whether the means of the two groups are equal). For treated and matched control

Table 2. Overview of the examined calls (target groups).

Categories	Supported activities	Target groups
I	Development of industrial parks, brownfield investments	Local governments, SMEs, cooperatives
	Incubation houses	Local governments, SMEs, non-profit organizations, cooperatives universities, research institutions
	Business site development, service development	SMEs, cooperatives
	Improvement of applied technologies; Improvement of productivity; application of new information technology (IT) solutions	SMEs, cooperatives
II	Consulting; business process development	Micro-, small and medium-sized enterprises (MSMEs), cooperatives, chambers
	Research infrastructure development; cooperation of business partners; product, service and technology development; launching of new products, services and technologies	SMEs, non-profit organizations
	Cooperation of education, research institutes and businesses	SMEs, non-profit organizations, cooperatives universities, research institutions
	Development of logistics centres; development of IT support centres; knowledge-intensive supplier sector development; improvement of market position of small and medium-sized enterprises (SMEs)	SMEs, cooperatives
III	Extension of business activities; IT development, procurement of software and hardware; Investment in tangible assets	Micro-enterprises, SMEs
IV	Extension of business activities; Finance of current assets	Micro-enterprises, SMEs

Source: Authors' compilation of data from www.palyazat.gov.hu.

groups the means represent the year of matching (one year before the subsidy was given for the treated); accordingly N shows the number of firms. The size of the control group is lower than the total number of the treated firms because some treated firms are pairs for the same controls. The results show that matched control and treated groups are statistically not different in many of the matching variables; however, some differences remained (sales and balance sheet growth from $t - 2$ to $t - 1$, region and sector). To eliminate these, we performed the difference in differences regression.

Finally, in the third step we applied a difference-in-difference regression. We implemented it by performing a simple ordinary least squares (OLS) regression (with robust standard errors) with

Table 3. Comparison of baseline characteristics between control and treated groups (HUF million).

	Projects	Minimum	Maximum	Mean	SD
Contracted value (€ ^a)	5687	1500	4,067,000	91,800	219,700

Note: ^aWe calculated the amounts in euros by using an exchange rate of €280/HUF and rounded to two digits (based on the 2010 end year rates).

Table 4. Comparison of baseline characteristics between control and treated groups (HUF million).

	Control (N = 5014)	Treated (N = 5118)	Difference (t-value)
Sales in $t - 1$	440	470	30 (1.22)
Balance sheet size in $t - 1$	320	330	10 (0.58)
Sales growth between $t - 2$ and $t - 1$	15	30	15** (2.72)
Balance sheet growth between $t - 2$ and $t - 1$	21	30	7* (2.35)
Employment in $t - 1$	18.6	18.8	0.2 (0.621)
Employment growth between $t - 2$ and $t - 1$	0.2	0.4	0.2 (0.137)
Manufacturing (%)	27.1%	23.6%	-2.5*** (-4.40)
Based in the more developed Central Hungarian Region (%)	36.8%	34.9%	-1.9* (-2.17)

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

Source: Authors.

the variables of interest as the dependent variables (log employment, sales and productivity), with categorical control variables (region, sector), time dummies (0 – year before the subsidy, 1 – two years after the subsidy), treatment dummies (0 – control, 1 – treated) and the interaction of the two as the independent variables. The latter is reported in our analyses as it captures the effect in time due to the treatment (in this case, subsidy) by controlling for both the permanent differences between the control and the treated and the time trends within the treated.

Generally, the above method is used to capture the effect of the treatment by comparing the changes in the variables of interest over time (in this case between one year before and two years after the subsidy) between a group that is treated (subsidized firms) and a group that is not (control firms).⁴ Thus, by using repeated observations of the same firms, this method controls for their unobservable time-invariant characteristics and those that affect all firms similar. Besides, our propensity score matching guarantees that the treated and not treated groups are similar in many observable characteristics (such as some firm-level control variables and also in the dependent variables) before the treatment. Thus, we can assume that the changes we see over time are due to the treatment received. We did separate difference-in-difference estimations for employment, sales and productivity (sales divided by employment). In our analyses, we used the logarithms of these three variables. Thus, in the empirical sections we present percentage changes (by what percentage a treatment changes employment, sales or productivity).

Subgroup comparisons

As we mentioned above, the recent literature on EU FIs in Hungary is quite limited. Besides, some methodological choices in our analysis differ from those presented in the published papers (without further details: selection of dependent variables, transforming the dependent variables, the criteria used for the selection of control firms, dealing with multiple treatments, combination and exclusion of subsidies). This is because we wished to offer a substantial contribution. For this purpose, besides the general analysis, we undertook some additional calculations by dividing our sample along different characteristics:

- We analysed the difference in performance between the treated and the control firms. As a reminder, the control firms were those that never received any of the EU subsidies the treatments did.
- We divided our treatment group by differentiating the subsidy types.⁵ The firms may have received FIs from the EDOP and/or RDOP-s; and/or a grant from the EDOP 4.1 and/or

CHOP 1.3.1. Based on these, we produced the following groups (total number: 5118): firms that received (1) grants ($N = 1498$); and (2) FI ($N = 590$).

- We analysed the impacts on the firms with different sizes: micro (1–9 employees, $N = 2917$), small (10–50 employees, $N = 1956$) and medium (51–250 employees, $N = 245$).
- We differentiated the firms by sectors: manufacturing ($N = 1158$) and other ($N = 3960$) and calculated the impacts on the two subgroups.
- The firms located in the more developed Central Hungarian Region (capital region) and firms in the other Hungarian regions (less developed) were separated, and the impacts on those were calculated.
- We divided all the firms (both controls and the treated ones) along their pre-subsidy productivity (sales per employee). We separated the firms being above or below the median in sales divided by the number of employees.

We matched the subsidized (treated) and non-subsidized (control) firms within each subgroup.

RESULTS AND POLICY RECOMMENDATIONS

The general results illustrate that receiving a subsidy increased both the employment level and the sales of the firms by 23.8% and 26.0%, respectively. However, in general, there is no significant effect on productivity (Figure 3). These results illustrate complete accordance with the findings of Banai et al. (2017a, 2017b). Despite the similarity of the results, they cannot, however, be fully

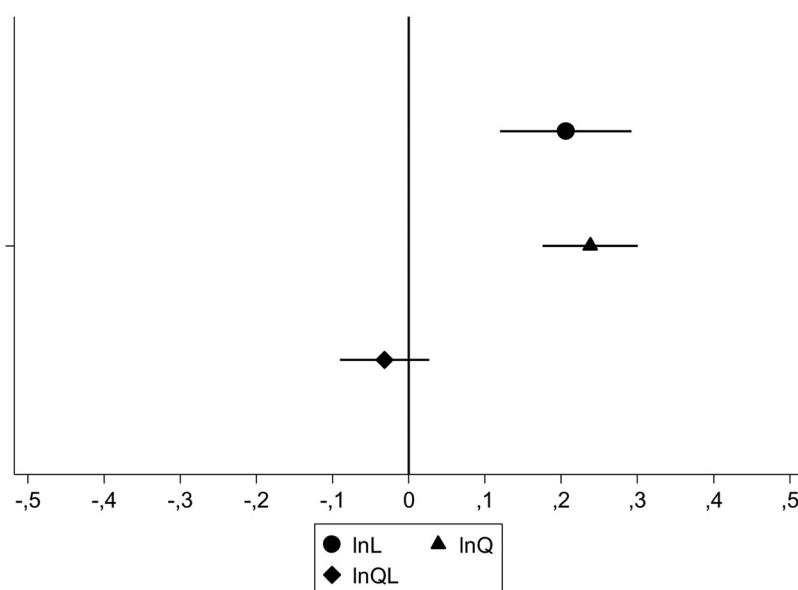


Figure 3. General effects of the subsidies.

Note: The horizontal axis shows the coefficients of the relationship between the interaction term (of time and treatment) and the three dependent variables. Points show the coefficients, while lines show the 95% confidence intervals. If confidence intervals do not cross the vertical line at zero, the relationship is statistically significant. The values ($\times 100$) mean percentages: by what percentage the subsidy increases employment, sales or productivity. The three dependent variables are below each other along the vertical axis represented by different symbols: circle (employment), triangle (sales) and diamond (productivity).

Table 5. Comparison between different types of subsidies (grants and financial instruments).

	Type of subsidy					
	Grant			Financial instrument		
	In L	In Q	In QL	In L	In Q	In QL
ATT	0.266***	0.215***	-0.051	0.201***	0.201*	0.001
R ²	0.085	0.133	0.149	0.074	0.089	0.124

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

Source: Authors.

Table 6. Comparison between the effects of subsidies on different firm size.

	Micro			Small			Medium		
	In L	In Q	In QL	In L	In Q	In QL	In L	In Q	In QL
ATT	0.310***	0.236***	-0.074	0.160***	0.172***	0.012	0.103	0.135	0.032
R ²	0.063	0.136	0.137	0.044	0.148	0.208	0.061	0.196	0.251

Notes: Size of firm in term of number of employees: 1–9 = micro and 10–50 = small, 51–250 = medium. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

Source: Authors.

Table 7. Comparison between the effects of subsidies for manufacturing and other firms.

	Manufacturing					
	No			Yes		
	In L	In Q	In QL	In L	In Q	In QL
ATT	0.238***	0.210***	-0.028	0.241***	0.199*	-0.042
R ²	0.014	0.029	0.020	0.056	0.068	0.042

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

Source: Authors.

Table 8. Comparison between the effects of subsidies in the different regions.

	More developed (Central Hungarian Region)					
	No			Yes		
	In L	In Q	In QL	In L	In Q	In QL
ATT	0.232***	0.207***	-0.025	0.248***	0.202**	-0.047
R ²	0.117	0.142	0.161	0.049	0.100	0.127

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

Source: Authors.

compared because of certain differing methodological decisions. As discussed above, in the present paper we aim to understand better the effects of subsidies by dividing the sample into subgroups. This is accomplished in the following sections.

Dividing the treated firms into two groups yields the following results: when subsidized firms received grants, the effects evidenced somewhat higher for employment and sales, but no significant effect was revealed for productivity (Table 5). Having compared the results with the groups that received FI, the results show that FIs produce similar significant, positive effects on

Table 9. Comparison between the effects of subsidies for more and less productive firms.

	Productivity					
	Less productive			More productive		
	In L	In Q	In QL	In L	In Q	In QL
ATT	0.206***	0.275***	0.034*	0.215***	0.197***	-0.018
R ²	0.117	0.118	0.065	0.085	0.079	0.098

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

Source: Authors.

employment and sales as grants. Nonetheless, due to their revolving nature, they represent a higher level of efficiency (FIs can be used for consecutive measures for different firms).

Measuring the impacts of subsidies on different firm sizes shows that the smaller the firm, the larger the impact (Table 6). For medium-sized firms, we could find no significant effects even for employment and sales (but for productivity, we could not find significant effects in any of the size categories). These results are intuitive since they express the fact that subsidies play a more significant role for firms that cannot obtain external financing from the market. Our policy recommendation is that smaller firms should be more in the focus of the SME development policies.

Examining the impact of subsidies on firms: whether or not they are manufacturing; or where they are located: in the less developed regions or in the well-developed capital region we have met significant positive findings for employment and sales (Tables 7 and 8).

When comparing less productive and more productive firms (see the definition in the subgroup comparison section) we again achieved significant findings (Table 9).

The results confirm that the effect of subsidies is higher for weaker companies (initially less productive) and generate less additional value for well-functioning (initially more productive) ones, particularly in terms of impacts on productivity.

CONCLUSIONS

Economic actors can raise finance for their development projects from different kinds of sources: public and/or private, refundable and/or non-refundable. Economic development and support for MSMEs bear vital strategic importance. The corresponding finance, which has been made available, is wide-ranging, from direct financial flows to credit guarantees or indirect funding. Commercial banks provide finance for the European MSMEs. Nevertheless, despite a notable increase in the availability of bank financing over the past years in Hungary, a financing gap still exists (Banai et al., 2017; Kondor & Nyikos, 2019; Nyikos, 2013, 2017). This implies that EU and public funds still satisfy a crucial function in financing economic development. Moreover, an efficiently functioning institutional system and financial sector play a decisive role both in fulfilling the financing requirements arising from the convergence process and the adequate allocation and implementation of the available funds.

Since EU accession, Hungary has received significant amounts of EU funds; one-fifth of the annual Hungarian GDP has been injected into the economy in the form of EU subsidies. The sources have averaged about 5% of national income annually, this has been accompanied by significant GDP growth. However, macroeconomic evaluations that have been published so far evidence varied results on how the EU funds have affected Hungarian GDP.

Both the EU and member states contribute markedly to establishing adequate conditions for MSMEs to access finance. However, the quality of private investments is primarily determined by corporate decisions. The medium- to long-term effect of investments encompasses the

influence they exert on the companies' competitiveness, the opening up of new job opportunities and eventually contributing to local wealth creation.

Besides private sources companies use both grants and FIs to finance their projects in Hungary. To evaluate the effectiveness and usefulness of public financial tools we used a counterfactual approach that enabled us to juxtapose comparable groups of supported and unsupported; grant- or FIs-aided companies. Based on the results, our conclusion is the following:

- Subsidies have generally brought about positive effects on employment and sales, nonetheless they have not contributed significantly to productivity.
- There are higher *employment* effects in the case of smaller and more productive firms; however, in the case of smaller and less productive firms importance rests with triggering higher sales.
- Comparison of grants and FIs illustrates that their effect on *employment and sales* is almost the same; however, as FIs have a revolving nature they generate more positive economic impact.
- Even though in both well- and less-developed regions there exists a positive impact on *employment and sales*, it is higher in the less developed regions.
- The productivity effect is varied: *subsidies have more significant effects on the initially less productive firms*, particularly in terms of productivity growth.

Investments and development projects form critical factors to economic development. Our results show that the use of subsidies (grants or FIs as well) has a positive impact on employment and sales; they do not really offer evidence for bettering productivity though. It is very important to note that even though FIs are considered to finance more efficient projects, in Hungary their added value essentially derives from their continued replenishment. Considering the very important factor that FIs are offering a continuing cycle of funding, the conclusion is that they have more positive impact on the economy than grants.

However, considering that through their projects non-VAT claiming organizations in the public sector create most of the tax effects, from a short-term budgetary point of view public investments generate significant revenue. If these projects prove a medium-to long-term positive economic effect and the use of these additional sources achieves a more positive impact on the economy than allocating EU finance to these public projects rather than to MSMEs appears to be a reasonable policy choice.

Cohesion Policy is expected to serve a diversified set of objectives (that include economic growth, competitiveness, employment, social inclusion, environmental sustainability, innovation, etc.). Based on the results of our research, the reason suggests giving preference in grant or FI funding to viable projects of companies that are not financed by commercial banks. However, current inadequate solutions instigate the need to introduce new policy tools and instruments for supporting, developing and improving the productivity of the Hungarian companies. Therefore, a tentative normative conclusion would be that we need a clearer evaluation of the performance of FIs as well as thorough monitoring of all the relevant implementation elements necessary for more effective and efficient use of EU funds.

NOTES

¹ Grants can be defined as non-refundable subsidies.

² Financial instruments are refundable subsidies defined in Financial Regulation as measures of 'financial support provided from the budget in order to address one or more specific policy objectives by way of loans, guarantees, equity or quasi-equity investments or participations, or other risk-bearing instruments, possibly combined with grants'.

³ In the 2000–06 programming period, €2.8 billion; in the period 2007–13, €25.3 billion; and in the period 2014–20, €25.0 billion.

⁴ See <https://www.mailman.columbia.edu/research/population-health-methods/difference-difference-estimation>.

⁵ Differently, but this is also done in most of the cited Hungarian papers.

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