Place Based Policies with Local Voting

Lessons From the EU Cohesion Policy

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This version: March 2025. First version: June 2021

Abstract

Governments often transfer resources from richer regions to poorer ones with the explicit goal of spurring growth in less-developed areas. The empirical evidence, however, finds that such transfers seldom generate growth, despite being large and repeated over time. Why? I offer an explanation that hinges on local political economy incentives faced by a local government that is in charge of how to spend the funds. In a general equilibrium spatial model with local voting, the preferences of an incumbent majority of low-skilled workers may lead the policy to fail and make the recipient region even poorer, even when voters rationally anticipate the consequences of their choices. Incumbent low-skilled political majorities may want to protect pre-existing declining industries rather than encourage transformation, which makes these workers better off at the expense of regional growth. I test the predictions of the model using data from the EU Cohesion Policy. I find that EU transfers are less likely to be invested towards technological development and innovation in regions with many low skilled workers, and that this then leads to fewer jobs created per euro. Consistent with the theory, both of these facts occur only when local governments manage the funds, but not when these are managed by centrally appointed authorities, who do not cater to local voters. This political economy explanation of why regional transfers may fail complements extant theories based on corruption or voters' myopia, and offers distinct policy implications.

*damico@g.harvard.edu. I am especially indebted to Alberto Alesina for his advice and relentless encouragement. I am grateful to Adrien Bilal, Edward Glaeser, Stefanie Stantcheva, Guido Tabellini, and Marco Tabellini for numerous essential comments. I thank, for their helpful comments and discussions, Constanza Abuin, Maxim Alekseev, Pietro Buri, Guido De Blasio, Luigi Guiso, Oliver Hart, Lawrence Katz, Gabriel Kreindler, Claudia Marangon, Ross Mattheis, Armando Miano, Namrata Narain, Daniel O'Connor, Marco Panunzi, Paolo Pinotti, Giacomo Ponzetto, Ken Rogoff, Giorgio Saponaro, Cailin Slattery, Andrei Shleifer, Elena Stella, and Lawrence Summers; as well as the participants at the NBER Urban Economics Summer Institute, at the Conference on Urban and Regional Economics and at the UEA North American meeting; and workshops at Bocconi University, EIEF, Harvard University, University of Barcelona, and the University of Münster. Damiano Raimondo provided excellent research assistance with the data collection, and I thank the "Pathways to Research and Doctoral Careers" program at the University of Chicago for funding.

Introduction

Why do regional transfers, even when large, often fail at countering regional disparities? Thirty-five years after the start of the EU "Cohesion Policy", Europe's largest ever place based redistributive policy, differences in economic conditions in the EU-15 are even larger than at its onset (Ehrlich and Overman, 2020). Moreover, causal evidence also shows that these policies rarely manage to induce growth.[1] What stands in the way? This work introduces an explanation that focuses on the political incentives faced by local governments, who are often in charge of such policies and are politically rewarded for them (Slattery, 2022).[2]

Regional transfers are often framed as transformative interventions that can put declining places onto new trajectories and create new "good jobs" (Rodrik and Sabel, 2022). The opening of a new semiconductor plant, the technological revitalization of an old artisanal district, the establishment of a state-of-the-art research center. In being transformative, these investments usually require a fair degree of skill-bias. Making way to chipmaking, for instance, requires subsidizing advanced industries, attracting a skilled workforce, and re-training the incumbent one. The policy adage is that these skill-biased investments bring growth to the region at large, "trickling down" to the incumbent workforce: even the "old" shoemakers will benefit from the "new" incoming chipmakers. But what if re-skilling is not as easy, or spillovers are not as large, so that the incumbent workforce prefers to directly subsidize their own sector, rather than encouraging transformation?

This is the core idea of the paper: if net spillovers from high-skilled sectors to low-skilled workers are not high enough, incumbent low-skilled workers might rather protect their own industries. And, because local governments only care about the incumbent workforce, the subsidy to incumbents is what ends up being enacted. In turn, this hampers growth in regions where the political majority is made by low-skilled workers. That is, a regional transfer meant to spur growth can end up doing just the opposite. It can increase regional inequality as declining places become further concentrated in declining industries. This consequence comes from the fact that places do not vote, people do. Workers will vote to maximize their own welfare, regardless of whether this makes their region more productive. This turns a policy that is aimed at helping places in a policy

[1] See, for instance, Becker et al. (2013), Accetturo et al. (2014), Ciani and de Blasio (2015), Barone et al. (2016), De Angelis et al. (2018), Becker et al. (2018), and Accetturo and de Blasio (2019).

[2] In the EU, local governments are often in charge of managing funds from the European Cohesion Policy, which is the largest place based policy in the continent. Possible reasons for such institutional design may stem from informational constraints or institutional constraints, which mandate that policies should be implemented at a level which is as close as possible to the final beneficiary (e.g. the principle of "partnership" for the EU). In the US, states and local governments were in charge of applying for areas to be designed as "Empowerment Zones" and "Enterprise Communities", a set of federal place based policies active between the 1990s and 2010s that granted tax incentives for employment in designated areas. Currently, local governments also control the lion share of place based policies (broadly defined), since they are in charge of designing subsidies to attract different types of firms to certain localities. These types of policies made up 78% of all US place based jobs policies in 2019 (Bartik, 2020).

that ends up helping *some people* in *some places*—even if this comes at the expense of the place at large.

To formalize the argument, I consider a two period model with two types of worker-voters—low and high skilled—who vote and decide where to live. Workers have arbitrary spillovers onto each other within each region—which can be interpreted as a reduced-form way to capture interactions among workers. In the first period workers decide where to live in a competitive equilibrium with no transfers. The national government then announces an arbitrary set of transfers to some regions, leaving to its incumbent workforce the decision on how to spend them. Incumbent workers vote on whether to subsidize the high or the low-skilled sector, and then all workers move again in the second period given the announced distribution of transfers.[3] When spillovers are constant elasticity functions of city size, the model yields a simple sufficient statistic that characterizes voting choices and that depends exclusively on the initial conditions and primitives of the model: the spillovers across workers and the migration frictions.

The benefit of subsidizing a worker's own sector is the sum of the direct benefit of the transfer and of the indirect general equilibrium effects that come from other workers' moving in or out of the region. The benefit or cost from subsidizing another type's sector comes only from the indirect effects. Such indirect effects include negative congestion forces—like higher housing prices from additional workers moving in—as well as positive productivity spillovers, for instance from attracting high-skilled workers. A given type of worker will decide to subsidize its own sector if the positive spillovers, net of congestion, coming from subsidizing the other type's sector are not so high as to dominate those that come by capturing the transfer.

If that is the case and if the national government transfers resources to poorer regions where the local majority is unskilled, then poorer regions will end up subsidizing unskilled industries. That is, shoemakers will protect shoemaking, because that is more beneficial—to them—than chipmaking. This ends up making the region even more intensive in shoemaking. Recipient regions become even more attractive to unskilled workers, who will migrate there, and possibly create congestion onto the high skilled ones that pushes them to leave. For instance, higher input demand from subsidized (and unskilled) sectors will artificially keep land prices high, which leads non-subsidized (and knowledge intensive) sectors to leave. As the distribution of local human capital becomes further biased towards low skilled workers, the region becomes poorer.

[3]Representing the place based policy as a transfer to a given type of worker in a given region follows the standard representation in the literature on place-based policies (Fajgelbaum and Gaubert, 2020). The additional simplifying assumption here only concerns the binary nature of the voting choice. My mechanism would not be at play if investments were not skill-biased. That is, if there existed projects that made the region more productive for everyone, with no trade-off between productivity and subsidies to specific types of workers. Yet, many investments seem skill-biased in nature, and the model is kept purposefully simple so to focus on this situation. In this case, a political conflict between high and unskilled workers arises and the model makes clear what are the conditions for this conflict to stifle growth.

The government is thus not achieving convergence, but one argument in favor of the policy is that at least the welfare of the unskilled workers in the poorer region increases. However, if the goal is to increase aggregate welfare of the unskilled, this is not necessarily the efficient tool for it. The regional transfer can be Pareto dominated by a place blind one to the unskilled workers, paid for with a tax on the high skilled ones. This is due to the fact that, under congestion or agglomeration externalities, the place based transfer may create deadweight losses by distorting location choices.

I bring the ideas of the model to the data by analyzing how place based transfers were invested during the 2007–13 tranche of the EU Cohesion Policy and how this affected the economic outcomes of the policy. The first prediction of the model is that, if funds are managed by local governments and spillovers are not too large, funds will be slanted towards the incumbent majority's sector. To test this, I exploit variation across regions in the local composition of the workforce and across investment programs in the types of authorities in charge of the expenditure of the funds. In particular, I manually inspect all operational programmes in the 2007–13 tranche and categorize whether the authorities in charge were either national (e.g. ministries of the central government), local but centrally appointed (e.g. prefects in France), or local and regionally elected (local governments). I then study whether different types of authorities used funds for different endeavors based on the local composition of the workforce. My main outcome of interest is the fraction of funds spent in technological development for firms, innovation, and research (henceforth, TD&I). Such projects cover around one eighth of the total funds invested and are interesting for two reason: *i)* they are good proxy for investments that benefit high skilled workers more than low skilled ones, and *ii)* they are usually regarded as vital to foster economic growth.

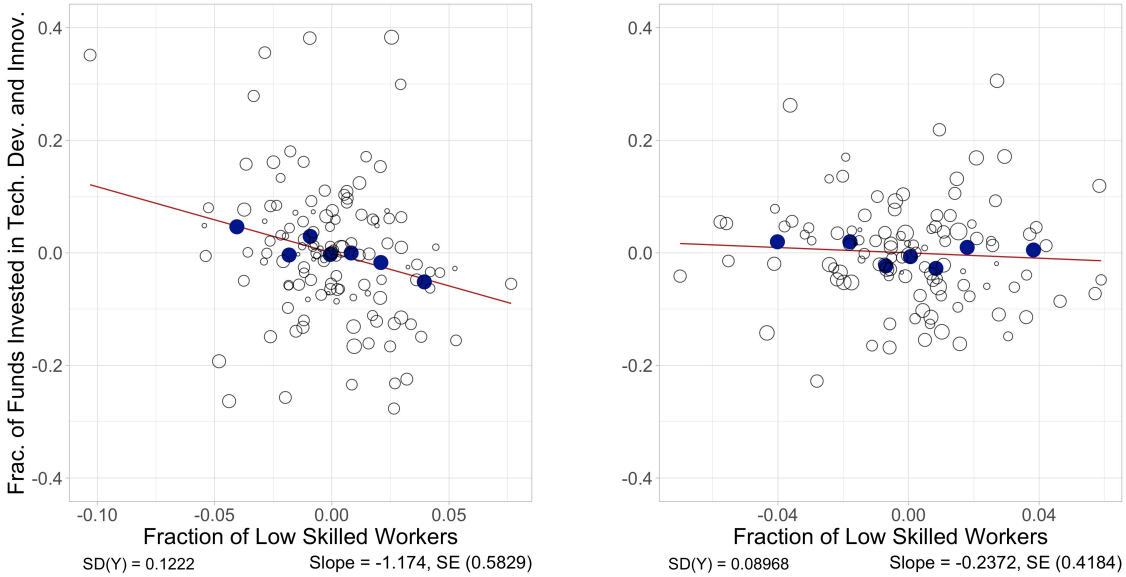
Figure 1 reports the gist of these findings. It plots the fraction of funds spent towards TD&I in a given region against the fraction of low skilled workers in that region, after partialing out country fixed effects and controls for sectoral composition of employment and other economic and demographic characteristics. In the left panel, I plot this relationship for programs managed by local governments, who cater to local voters. The right panel focuses instead on programs that are managed by centrally appointed authorities who do not run for local elections but are still based in the region (e.g. prefectures and special development agencies). Consistent with the theory, I find that EU funds are less likely to be invested in TD&I in regions with many low skilled workers, but only if programs are managed by local governments. When local governments are in charge of the funds, a five percentage point increase in the fraction of low skilled workers (57% of the SD across regions) is associated with a reduction of the fraction invested in TD&I of 28% at the mean (a 5.9 p.p. reduction). In monetary terms, local governments in a region with 5 p.p. more low skilled workers invests on average €103 million less in TD&I over the 2007–13 cycle, 10% of the average allocation that they control.

Data at a subregional-level allows me to see in which kinds of projects does the foregone TD&I

FIGURE 1: REGIONAL INVESTMENT IN TECHNOLOGICAL DEVELOPMENT AND INNOVATION VS. FRACTION OF LOW SKILLED INDIVIDUALS, BY TYPE OF PROGRAM

(A) REGIONAL PROGRAMS MANAGED BY LOCAL GOVERNMENTS

(B) REGIONAL PROGRAMS MANAGED BY CENTRALLY APPOINTED AUTHORITIES



Note: the figures report the residual of the fraction of funds invested in technological development for firms, innovation, and research at the NUTS2 level (on the y-axes) against the residual of the fraction of low skilled individuals at the NUTS2 level (on the x-axes), across 236 EU regions. Residuals are obtained by regressing each variable on country fixed effects and regional characteristics, as detailed in Appendix Section B.1. Each circle represents a NUTS2 region and reports the raw residual while solid points report binned means. The size of the circle depends on the log GDP at the NUTS2 level. Standard errors are robust to heteroskedasticity.

spending go. Local governments may be investing less in technological development, but perhaps they are investing more in other productive endeavors such as infrastructure or supporting labor market policies that encourage labor force participation. Looking at these spending categories, it seems that most of the substitution between high- and low-tech projects operates within subsidies to firms. Local governments in low skilled regions are not investing more in infrastructure or other policies, they are mostly substituting technologically-intensive subsidies to firms with subsidies for other non high-tech projects.

The data also records the economic sector targeted by the intervention, distinguishing between 21 broad aggregates, which allows to study whether this variation occurs mostly across sectoral aggregates or also within. The negative correlation between technological investment and fraction of low skilled workers holds within broad sectoral aggregates targeted (21 aggregates), with the coefficient decreasing by a third when adding sector fixed effects. That is, the data shows that local governments in unskilled regions are less likely to choose technologically advanced projects within the same targeted sector. Indeed, it seems that local governments in unskilled regions are choosing

shoemaking over chipmaking, not only manufacturing over research. This finding is confirmed in a case study for Italy, where I can use even more precise payment-level evidence that distinguishes between knowledge-intensive and unskilled subsectors.

The second prediction of the model is that slanting expenditure for political returns has effects on growth—something that, unfortunately, cannot be credibly tested by relying on aggregate regional growth data. To test this prediction, I use a dataset of program-level outcomes that was collected by the Commission as part of its evaluation of the Cohesion Policy. This reports data on jobs created by each program. I find that, across different investment programs, a higher fraction of investment in TD&I is correlated with a higher number of jobs created per euro spent, thus confirming that these investments are relevant for growth. Accordingly, the data shows that local governments in regions with many low skilled workers create fewer jobs per euro, compared to those in regions with few low skilled workers. In line with the evidence on types of expenditure, this does not occur when funds are managed by centrally-appointed authorities, again suggestive of political motivations.

An alternative interpretation of my empirical results is that local governments in low skilled intensive regions do not invest in TD&I because there is no scope for such investments. In this case, the difference in slopes between local governments and other authorities can be explained by the fact that local governments understand this, while local authorities that are centrally appointed do not. This is hard to believe as they likely face the same information set: both authorities are locally based, they only face different incentives. However, even if one believes that local governments have an informational edge, the evidence on jobs created goes in the opposite direction. The relationship between jobs created and funds invested in TD&I is especially strong for poorer regions, suggesting that such investments are especially beneficial in poorer areas. In addition to this evidence, I review several examples from the literature that show that policies fail or are less effective in regions with many low skilled workers (Becker et al., 2013; Ciani and de Blasio, 2015; Barone et al., 2016; Accetturo and de Blasio, 2019; Albanese et al., 2021) and when they are subject to local political control (Felice and Lepore, 2017; Cingano et al., 2022; Buscemi and Romani, 2022).

The political channel developed here complements other explanations of why place based policies may fail. These more traditional explanations—which are likely an important determinant of why place based policies fail—focus on funds being misappropriated and plagued by corruption, on opportunistic politicians, or other forms of weak institutions.[4] The channel presented here arises even fixing the quality of institutions. It is the positive outcome of a political conflict between heterogeneous workers, where incumbent unproductive majorities decide the allocation of

[4]See for instance, Brollo et al. (2013), Accetturo et al. (2014), De Angelis et al. (2018), and Pereira dos Santos et al. (2022).

the policy.

Related Literature In addition to the studies on the EU Cohesion Policy mentioned above, this work is mainly related to three strands of literature. First, it contributes to a relatively small strand of the literature that merges spatial economics and political economy (Tiebout, 1956; Bewley, 1981; Epple and Romer, 1991; Fernandez and Rogerson, 1996; Glaeser and Shleifer, 2005; Calabrese et al., 2006; Alesina et al., 2015). To accommodate both migration and voting choices, this part of the literature puts restrictions on either the spatial structure of the economy or on sorting patterns, which yields tractability of political choices at the expense of the richness of spatial ones. I propose a different approach that does not make such restrictions, accommodates modern spatial models, and, based on local perturbations around an equilibrium, still yields voting choices in a tractable way.

This paper also touches upon a part of the political economy literature that studies the optimal level of decentralization (Oates, 1972; Lockwood, 2002; Besley and Coate, 2003; Boffa et al., 2016). I point at a trade-off of decentralizing place based policies: if the central government wants to counter an initial spatial equilibrium, then policy-setting that matches local preferences might go against that objective, since the local incumbent majorities are the product of that same equilibrium the central government is trying to counter.

Third, this paper adds to the strand of the literature that studies place based policies (for a recent review, see Neumark and Simpson, 2015) and, in particular, to the rationales and effects of such interventions (Glaeser and Gottlieb, 2008; Moretti, 2011; Kline and Moretti, 2014; Austin et al., 2018; Fajgelbaum and Gaubert, 2020; Rodrik and Sabel, 2022). I build on this debate and show that, even if one takes an optimistic view on place based policies, some improvements might be unattainable due to the presence of political constraints.

The remaining part of the paper proceeds as follows. Section 1 formally outlines the theoretical framework. Section 2 describes the institutional context behind the EU policies, arguing that it is an ideal setting to test the implications of the theory. I then turn to the empirical analysis in Section 3, which describes the data, and 4, which reports the results. Finally, the last section concludes.

1 Theoretical Framework

Sections 1.1 and 1.2 set up and solve a two-period model of place based policies under local voting, where a central government endows some regions with a transfer and local governments decide how to spend it. In Section 1.3, I apply the model to evaluate the effect of a convergence-seeking transfer in an economy with rich and poor regions.

1.1 Setup

Agents live two periods, $t = 0,1$, and are mobile in both. The economy is governed by a spatial and a political equilibrium, to be defined below.

Spatial Part Suppose that the economy is made of L^θ workers of type θ, who can be either low or high skilled ($\theta \in \Theta = \{L,H\}$), and many cities $j \in \mathcal{J}$, assumed to be small enough such that utility in one does not affect aggregate utility in the economy. Each worker lives and works in a city j at time t, and $L^\theta_{j,t}$ denotes the number of workers of type θ in city j at time t.

In every period, all individuals consume a nationally traded good which is produced in each city by labor only. In order to consume, workers inelastically supply substitutable effective labor units of z^L_{jt} and z^H_{jt}; so that total production in a city, Y_{jt}, is $Y_{jt} = z^L_{jt}L^L_{jt} + z^H_{jt}L^H_{jt}$. To capture spillovers, such productivities can depend on the amount of workers in the city (and will be defined precisely below). Atomistic firms offer workers their marginal product, taking as fixed the distribution of efficiency units in each city. The wage of each worker of type θ, w^θ_{jt}, is thus equal to the effective labor units she supplies, $w^\theta_{jt} = z^\theta_{jt}$. The worker may also receive a type- and place based transfer from the government of $\tau^\theta_{jt} \geq 1$, and a type- and place-blind tax of $\bar{\tau}_t \leq 1$, so that total consumption is $c^\theta_{jt} = z^\theta_{jt}\tau^\theta_{jt}\bar{\tau}_t$. In addition to consuming goods, individuals enjoy type- and city-specific amenities a^θ_{jt}, which can also be a function of city sizes. Utility of a worker i, of type θ, in city j, at time t, is:

$$u^\theta_{ijt} = a^\theta_{jt}z^\theta_{jt}\tau^\theta_{jt}\bar{\tau}_t\varepsilon^\theta_{ij}$$

where ε^θ_{ij} is an idiosyncratic taste of worker i for city j, assumed to be Fréchet distributed with scale σ_θ. The shock is drawn in period 0 only. As in Fajgelbaum and Gaubert (2020), within-city spillovers are captured by allowing a^θ_{jt} and z^θ_{jt} to be flexible city-and-type specific functions of city sizes, which serve as a reduced-form representation of agglomeration and congestion forces. That is:

$$a^\theta_{jt} = a^\theta_j(L^L_{jt}, L^H_{jt}); \qquad z^\theta_{jt} = z^\theta_j(L^L_{jt}, L^H_{jt})$$

and spillovers of worker θ' on θ in amenities and productivity are denoted, respectively, as $\gamma^{A,j}_{\theta',\theta} := \partial \log a^\theta_j / \partial \log L^{\theta'}_j$ and $\gamma^{P,j}_{\theta',\theta} := \partial \log z^\theta_j / \partial \log L^{\theta'}_j$ for all θ, θ'.

Let boldface letters denote the vector of all labor allocations and transfers, i.e. $\mathbf{L}_t = \{(L^L_{jt}, L^H_{jt})\}_{j\in\mathcal{J}}$ and $\boldsymbol{\tau}_t = \{\bar{\tau}_t, (\tau^L_{jt}, \tau^H_{jt})_{j\in\mathcal{J}}\}$. An interior spatial equilibrium is as follows.

Definition 1 (Regular Spatial Equilibrium)**.** *Given $\boldsymbol{\tau}_t$, an allocation $\mathbf{L}_t \in \mathbb{R}^{|\mathcal{J}|}_{++}$ constitutes a regular spatial equilibrium if:*

$$\textit{for all } i,j \textit{ such that } i \textit{ lives in } j \textit{ at time } t \qquad u^\theta_{ijt} \geq u^\theta_{ikt} \quad \textit{for all } k \tag{1}$$

Under the feasibility constraint on the total number of workers:

$$\sum_j L_{jt}^{\theta} = L^{\theta} \quad \textit{for all } \theta \tag{2}$$

Thus, agents choose every period where to live in order to maximize their current utility—which makes the migration choice static. Given the distributional assumptions on the taste shock, sizes satisfy:

$$\frac{L_{jt}^{\theta}}{L^{\theta}} = \frac{\left(a_{jt}^{\theta} z_{jt}^{\theta} \tau_{jt}^{\theta} \bar{\tau}_t\right)^{1/\sigma_\theta}}{\sum_j \left(a_{jt}^{\theta} z_{jt}^{\theta} \tau_{jt}^{\theta} \bar{\tau}_t\right)^{1/\sigma_\theta}} \tag{3}$$

Policy and Timing The policy consists in a transfer from the central government to some regions, and the timing is as follows.

— In period 0, the economy starts from a competitive equilibrium, where $\tau_{j0}^{\theta} = 1$ for all j, θ, $\bar{\tau}_0 = 1$, and sizes satisfy (3).[5]

— Between period 0 and 1:

  – the national government announces that in period 1 it will endow cities in a set $\mathcal{J}' \subset \mathcal{J}$ with transfers of $\{t_{j1}\}_{j \in \mathcal{J}'}$, that will be paid for via a lump sum tax of $\bar{\tau}_1$ on all workers. This announcement is unexpected in period 0.

  – local governments in $\mathcal{J}'$ hold elections on whether to allocate the transfer to low or high skilled workers, and then announce that they will implement the winning transfer.

— In period 1, workers migrate to re-establish the spatial equilibrium, given the array of transfers announced. Production then takes place, transfers are disbursed, and taxes are levied. The tax rate satisfies the aggregate budget constraint, which is:

$$\sum_j \sum_\theta L_{j1}^{\theta} z_{j1}^{\theta} \tau_{j1}^{\theta} \bar{\tau}_1 = \sum_j \sum_\theta L_{j1}^{\theta} z_{j1}^{\theta} \tag{4}$$

Political Part Having defined the spatial equilibrium and the policy, it is possible to define the political equilibrium that governs how transfers within each region are spent. The within-city allocation is decided according to the will of the incumbent local constituents, who need to make the binary choice of whom to allocate the transfer that will be disbursed in the next period, under the local budget constraint.

[5] Starting from a pre-existing set of transfers can be easily introduced.

Definition 2 (Voter's Problem)**.** *Given an announced regional transfer of t_{jt}, a voter i that lives in city j at $t-1$ chooses whether the transfer will go to the low or the high skilled workers by solving:*

$$\begin{aligned}
\mathcal{P}_i^\theta := \max_{\theta^*=L,H} \quad & u_{ijt}^\theta(\tau_{jt}^L, \tau_{jt}^H, L_{jt}^L, L_{jt}^H) \\
s.t. \quad & \mathbf{L}_t \text{ satisfies } (3) \\
& \sum_j \sum_\theta L_{jt}^\theta z_{jt}^\theta \tau_{jt}^\theta \bar{\tau}_t = \sum_j \sum_\theta L_{jt}^\theta z_{jt}^\theta && (5) \\
& L_{jt}^\theta z_{jt}^\theta (\tau_{jt}^\theta - 1) = t_{jt} \qquad \text{for } \theta = \theta^* && (6) \\
& \tau_{jt}^\theta = 1 \qquad \text{for } \theta \neq \theta^* && (7)
\end{aligned}$$

where the first constraint is the spatial equilibrium constraint, the second is the national government budget constraint, the third is the local government budget constraint, and the last one forces the choice to be binary.[6]

It is now possible to define the political equilibrium.

Definition 3 (Local Political Equilibrium)**.** *Given an initial allocation of workers $\mathbf{L}_0$ and a transfer t_{j1} to region j, a feasible subsidy profile $\boldsymbol{\tau}_{j1}^*$ constitutes a political equilibrium if it is the bliss point of the majority of workers among those incumbent in city j.*

Lemma 1. *If voters i and i' are of the same type, then* $\arg\max \mathcal{P}_i^\theta = \arg\max \mathcal{P}_{i'}^\theta$. *Thus, letting $\hat{\theta}_{jt}$ be the majority type in the incumbent population in j at time t, a feasible subsidy profile $\boldsymbol{\tau}_{j1}^*$ constitutes a political equilibrium if and only if $\boldsymbol{\tau}_{j1}^*$ is type $\hat{\theta}_{j0}$'s bliss point.*

Proof. Each voter within a group will maximize the same objective function, up to multiplicative differences in taste. Thus, there is no within-group heterogeneity in voting preferences. □

Equilibrium It is possible to finally define the overall equilibrium of the economy.

Definition 4 (Equilibrium)**.** *Given a regional transfer t_{j1} to regions $j \in \mathcal{J}'$, an allocation of workers and type-specific transfers, $(\mathbf{L}_t, \boldsymbol{\tau}_t)_{t=0,1}$, is an equilibrium if:*

1. Given $\boldsymbol{\tau}_t$, $\mathbf{L}_t$ is a spatial equilibrium at all t.

[6]Note that the definition of the problem shows that voters are sophisticated and take into account all the general equilibrium effects of the policy voted. However, the problem is formulated as if they vote assuming that they will stay in the city. This excludes that voters could want to vote for policies in their city so to indirectly affect utilities in the other cities to which they plan to move. If cities are small, however, this cannot happen since each single city has no effect on utilities in other cities.

2. Given $\mathbf{L}_0$, $\boldsymbol{\tau}_{j1}$ is a local political equilibrium in all cities $j \in \mathcal{J}'$.

3. The central government's budget is balanced, i.e. (4) holds, and all local governments' budgets are balanced, i.e. (6) and (7) hold for all $j \in \mathcal{J}'$.

1.2 Solution

Solving the model requires characterizing the voting preferences, since the spatial part is standard given the transfers. When voting, workers realize that transfers have a direct effect on utility, by raising consumption of the type of workers that receive it, and an indirect effect, by affecting city sizes. If spillovers are constant elasticity and cities are small, the relative benefits of different allocations can entirely be stated in terms of primitives around a competitive equilibrium. We characterize the voting choice in this simpler and transparent case, while Appendix Section A.1 derives the voting condition in the more general case.

Proposition 1 (Voting Solution)**.** *For a worker of type θ, denote with g^θ the relative benefit of capturing the transfer rather than allocating to a worker of the other type ($\neg\theta$). So that a worker of type θ prefers to capture a transfer if and only if $g^\theta \geq 0$. Around a competitive equilibrium with no transfers, the sign of g^θ is given by:*

$$sign\left(g^\theta\right) = \underbrace{1}_{\text{Direct effect}} + \underbrace{\sum_{\theta'=L,H}\left(\underbrace{\gamma^A_{\theta',\theta} + \gamma^P_{\theta',\theta}}_{\text{Spillovers}}\right)\cdot\left(\underbrace{\varepsilon^\tau_{\theta,\theta'} - \varepsilon^\tau_{\neg\theta,\theta'}\frac{Y^\theta_{j,0}}{Y^{\neg\theta}_{j,0}}}_{\text{Migration response}}\right)}_{\text{General equilibrium effects}} \tag{8}$$

where $Y^\theta_{j,0}$ is the GDP produced by type θ in region j in the competitive equilibrium, and where $\varepsilon^\tau_{\theta,\theta'} = \partial \log L^{\theta'}_{jt} / \partial \log \tau^\theta_{jt}$ is the migration elasticity of type θ' with respect to a subsidy to θ, which is constant across cities and time if spillovers are constant elasticities.[7]

Proof. See Appendix Section A.1. □

Equation (8) yields a sufficient statistic in terms of primitives and data ($Y^\theta_{j,0}$) that allows to derive the relative incentives of a voter in any city. As anticipated, these are the sum of the direct increase in consumption (the first term, indexed to 1), and the indirect spillovers from each type θ' (first parenthesis), weighted by the differential migration response of θ' in the two different allocations of transfers (second parenthesis).[8]

[7] See Equation (17) for the derivation of the migration elasticities.

[8] The latter is given by the migration elasticities weighted by the fraction of GDP of region j that is produced by type θ. This is because such fraction determines, around the competitive transfer, how much does the proportional

The sufficient statistic elucidates how voters in the model trade-off benefits and costs of the spatial policy. Some examples are useful to explore some of its implications and to fix the intuition. Assume, for instance, that low and high skilled workers work have few interactions among each other, so that workers only create congestion spillovers, captured by $\gamma_A < 0$. Assume also that they face the same migration frictions ($\sigma_H = \sigma_L = \sigma$). In this case, Equation (8) becomes $g^\theta \propto 1 - \gamma^A(1+\tilde{y})$ where $\tilde{y}$ is the share of local GDP created by type θ over that created by type $\neg\theta$. Then g^θ is always positive, since $\gamma^A < 0$ and $\tilde{y} > 0$. That is, type θ will always want to capture the transfer. This is because the inflow of any one type of worker has the same (negative) effect on its utility. Hence, the indirect general equilibrium effects are identical under the two allocations and type θ is surely better off by capturing the transfer, so to benefit from the direct effects.

For a less trivial case, assume that type low-skilled workers create congestion on other low skilled workers and no productive spillovers. High skilled create instead positive productive spillovers on the unskilled and no congestion. That is, $\gamma^A_{L,L} < 0, \gamma^P_{H,L} > 0$ and all other spillovers are zero. Migration frictions are kept different, so to capture that one group might be more mobile than the other. Will the unskilled want to attract the high skilled, or will they want to capture the transfer? The sufficient statistic is:

$$g^L \propto 1 + \gamma^A_{L,L}\left(\varepsilon_{L,L} - \varepsilon_{H,L}{}^{Y^L_{j,0}/Y^H_{j,0}}\right) + \gamma^P_{H,L}\left(\varepsilon_{L,H} - \varepsilon_{H,H}{}^{Y^L_{j,0}/Y^H_{j,0}}\right)$$

where again denote by $\tilde{y}$ the ratio of local GDP created by type L over that created by type H. Type L will want to capture the transfer if and only if:

$$\frac{\sigma_H}{\tilde{y}} > \gamma^P_{H,L}$$

The left term is the net amount of high skilled that a transfer to them can attract: this depends on the migration friction σ_H and inversely on the share of GDP that they are responsible for in the location. The higher this $\tilde{y}$, the lower the subsidy that the government of j can afford to give to H in proportion to their wage (since a higher $\tilde{y}$ implies a higher local wage bill for H). Hence, fewer of them can be attracted to j. The right hand side is simply the spillover from H to L, if this is higher than the migration frictions, then L finds it optimal to attract H instead of capturing the transfer, so to benefit from the indirect general equilibrium effects. An interesting result is that the condition is independent of either the migration response of L or the congestion that workers of type L create onto each other. The reason is that the negative effect of the migration from L cancels out under the two regimes: workers of type L will be attracted to j either if they get the transfer or

subsidy increase as the aggregate transfer increases. If type θ accounts for a large fraction of regional GDP, the subsidy to type θ will be lower for the same amount of t_j, since it is a subsidy on a higher tax base.

if more of H migrates to j, since they increase the utility for L. Thus, the indirect negative general equilibrium effect from the inflow of L arises in both cases, and cancels out when comparing the two options. This result would be identical if workers of type L were to create some negative or positive spillovers on H, since their migration response would arise in both cases. What uniquely determines whether it is optimal for L to capture the transfer or not is thus only the migration response of H and its spillover on L.

The next Section applies the model to study the effects of place based transfers that try to achieve regional convergence by transferring resources from richer to poorer regions. To do so, I assume standard functional forms that allow me to solve analytically for the spatial equilibrium and endogenously deliver a dual economy (with rich and poor regions) that motivates the central government to intervene. This application shows that, due to local voting and migration, place based transfers can be self-defeating and end up increasing regional inequality.

1.3 An Application to Place Based Policies for Regional Convergence

This section develops the example of a central government that transfers resources to poorer regions to achieve regional convergence. In the interest of parsimony, the economy features a simple representation of congestion and agglomeration and is kept purposefully minimal. These simplifications, stated below, can be relaxed at no expense to the key intuition.

The economy will be made by many cities divided across two regions, the North and the South, which are identical except for the fact that high skilled workers have an exogenous preference for amenities in the North, compared to the South. Under no transfers, this will create an initial equilibrium where the high skilled workers are endogenously more abundant in the North, and the low skilled ones in the South. Since high skilled workers are more productive than low skilled ones, the North will also be richer (in terms of product per capita) than the South—which motivates a divergence-averse planner to transfer resources to the South. It is useful to state the assumptions formally:

A1 Economy: low and high skilled workers are in equal number, $L^L = L^H = J$, and they have the same variance of taste shocks ($\sigma_L = \sigma_H = \sigma$). Cities are in large number but of two types. There are J cities in the set N (North), denoted with $j = n$, and J cities in S (South), denoted with $j = s$.

A2 Spillovers: amenities and productivity are Cobb-Douglas. In particular:

$$a_{jt}^{\theta} = \iota_j^{\theta} (L_{jt}^L)^{\gamma_{L,\theta}^A} (L_{jt}^H)^{\gamma_{H,\theta}^A}; \quad z_{jt}^{\theta} = \phi_j^{\theta} (L_{jt}^L)^{\gamma_{L,\theta}^P} (L_{jt}^H)^{\gamma_{H,\theta}^P}$$

where $\iota_j^\theta, \phi_j^\theta$ are exogenous amenity and productivity shifters, respectively. All workers create identical congestion spillovers onto each other, captured by the fact that amenities are a decreasing function of city size. Agglomeration comes from high skilled workers, which have symmetrical productive spillovers on all other types of workers. That is:

$$\gamma^A_{\theta',\theta} = \gamma^A \leq 0, \forall \theta, \theta'; \qquad \gamma^P_{H,\theta} = \gamma^P \geq 0, \gamma^P_{L,\theta} = 0, \forall \theta \tag{9}$$

I assume the regularity condition that $\sigma - \gamma^A - \gamma^P > 0$, which ensures, for any θ, that an increase in city j of the exogenous fundamentals for type θ increases its size there (that is, it ensures $\partial L^\theta_{jt} / \partial x^\theta_{jt} > 0$ for $x = \iota^\theta_j, \phi^\theta_j$ and $\theta = L, H$).[9]

A3 Shifters: *i.* high skilled workers have a higher shifter for amenities in the North, with $\iota^H_n = \iota > 1$, while shifters for all other cities and types are normalized to 1. *ii.* High skilled workers have a higher productivity shifter than low skilled ones everywhere, that is: $\phi^H_j = \phi > 1, \forall j$. The productivity of low skilled workers is normalized to 1, $\phi^L_j = 1, \forall j$.

Effects of the transfer What are the effects of such transfer on the Southern economy and on regional inequality? Since low skilled workers are more abundant in the South, they hold the political power and the local government enacts their will. Thus, to determine how the transfer will be spent in the South it is enough to apply equation (8) for the low skilled workers, which yields:

$$g^L < 0 \iff \gamma^A + \gamma^P > \sigma \left(\frac{Y^H_{s,0}}{Y^L_{s,0} + Y^H_{s,0}} \right) \tag{10}$$

That is, for low skilled workers to desire attracting high skilled workers ($g_L < 0$), agglomeration forces ($\gamma^A + \gamma^P$) must be greater than migration frictions (σ), with the latter weighted by the fraction of the Southern GDP created by the high skilled workers in the competitive equilibrium, $Y^H_{s,0} / (Y^L_{s,0} + Y^H_{s,0})$.

Hence, if net agglomeration forces are low enough and/or migration frictions are high enough, the transfer will be captured by the low skilled workers in the South. The South will thus become more attractive to low skilled workers, which will migrate in and create congestion externalities. Some high skilled workers will then leave for the North, making the South poorer and less productive. This decreases wages for all workers in the South, as well as GDP per capita. As shown in Appendix Equation (18), the effect on GDP per capita is the sum of two components: a composition effect given by the fact that there is now a higher fraction of the less productive type, and

[9] In the full model, i.e. without assuming (9), the assumption is: $\prod_\theta \left(\sigma_\theta - \gamma^A_{\theta,\theta} - \gamma^P_{\theta,\theta} \right) - \prod_\theta (\gamma^A_{\theta,\neg\theta} + \gamma^P_{\theta,\neg\theta}) > 0$ and that $\sigma_\theta - \gamma^A_{\theta,\theta} - \gamma^P_{\theta,\theta} > 0$.

the loss of spillovers from the high skilled that leave. In the aggregate economy, the transfer thus increases regional inequality.

Solving the model numerically also allows to show that the welfare of the low skilled workers in the South increases, at the expense of welfare of all other workers. Aggregate welfare for low skilled workers also increases, and that for high skilled workers decreases. If congestion forces are high enough, a place-blind policy that transfer resources to low skilled workers by taxing the high skilled Pareto dominates the politically-determined place based transfer. This is because, when congestion is high, the political solution further increases sorting, since the policy favors the incumbent majority in the South. When congestion forces are high, such sorting is inefficient and creates a deadweight loss, which can be avoided under a place-blind transfer.

Proposition 2 outlines the voting solution and the effects on growth formally. Section 1.3.1 presents the numerical simulations.

Proposition 2 (Effects of a regional transfer to the South)**.** *Let primitives be such that A1 to A3 hold. Let* $\boldsymbol{\tau}_{s1}^{\theta} \in \mathbb{R}^2$ *be the corner solution that exhausts the local budget when the regional transfer* t_{s1} *is allocated to type* θ*. A low skilled worker in the South desires to allocate the transfer to the high skilled workers if and only if:*

$$u_{s1}^{L}(\hat{\boldsymbol{\tau}}_{s1}^{L}) \geq u_{s1}^{L}(\hat{\boldsymbol{\tau}}_{s1}^{H}) \iff g^{L} = (\sigma - \gamma^{A} - \gamma^{P}) \log \hat{\tau}_{s1}^{L} - (\gamma^{A} + \gamma^{P}) \log \hat{\tau}_{s1}^{H} \leq 0 \tag{11}$$

where $(\sigma - \gamma^{A} - \gamma^{P}) \log \hat{\tau}_{s1}^{L}$ *is the net benefit of capturing the transfer, while* $(\gamma^{A} + \gamma^{P}) \log \hat{\tau}_{s1}^{H}$ *is the net benefit of using it to attract the high skilled workers.*

When $g > 0$*, the transfer is captured by the low skilled in the South. This leads more low skilled workers to migrate there, and high skilled ones to migrate to the North. In turn, it decreases wages for all workers in the South, as well as GDP per capita.*

Proof. See Appendix Section A.2. □

1.3.1 Welfare Effects

Before concluding this Section, I show the intuition graphically as well as the effects on welfare by solving the model numerically under a simple value of parameters that is meant only to discuss the intuitions. I parametrize $\iota = 1.2, \phi = 1.5$, and $\sigma = 2$.[10] I start from Figure 2, which plots the first and second addendum of Equation (11) for a low skilled worker: these are the benefit of capturing the transfer (g_{Cap}^{L}, in blue) and that of giving it to the high skilled (g_{Give}^{L}, in red). They are plotted

[10] A richer quantitative simulation is outside the scope of this paper as it requires identified estimates of the main elasticities, but it would be interesting and feasible under the theoretical setup, which can quantitatively accommodate more realistic forces such as housing price dynamics.

as a function of the productivity spillover from the high skilled, γ^P, fixing the congestion spillover $\gamma^A = -.2$. The vertical dashed line represents the locus where $g^L = 0$. At the right of this point, low skilled workers vote to allocate the transfer to the high skilled ones. At the left, they capture it. The right panel shows the same plot, under a higher $\sigma = 2.2$. As anticipated in the previous Section, the locus moves to the right, indicating that net spillovers must be higher for low skilled workers to desire to attract high skilled ones. This is because higher values of σ imply lower migration responses to transfers, which decreases the benefit of attracting high skilled workers and increases the benefit of capturing the transfer. Indeed, $\hat{g}^L_{Give} < g^L_{Give}$ and $\hat{g}^L_{Cap} > g^L_{Cap}$ for all values of γ^P.

FIGURE 2: RELATIVE BENEFITS OF CAPTURING VS. GIVING THE SUBSIDY FOR LOW SKILLED WORKERS IN THE SOUTH

(A) $\sigma = 2$ (B) $\sigma = 2.2$

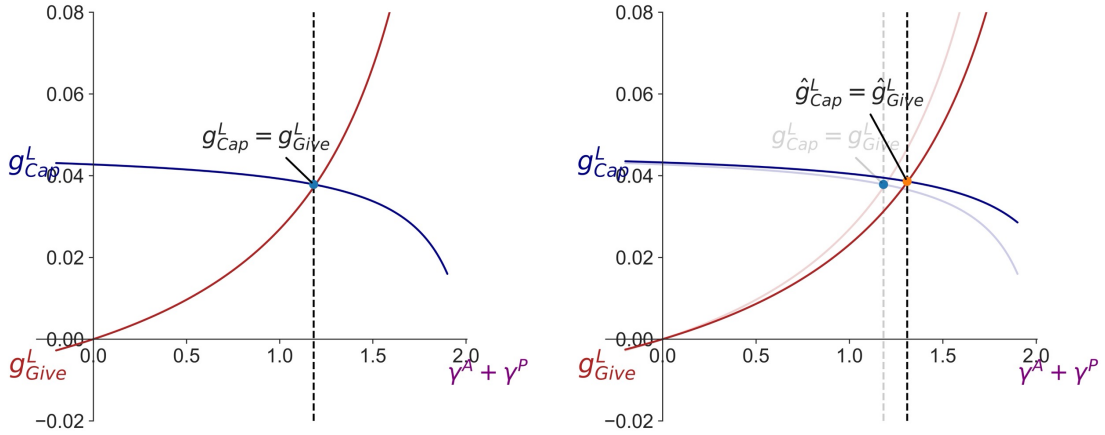
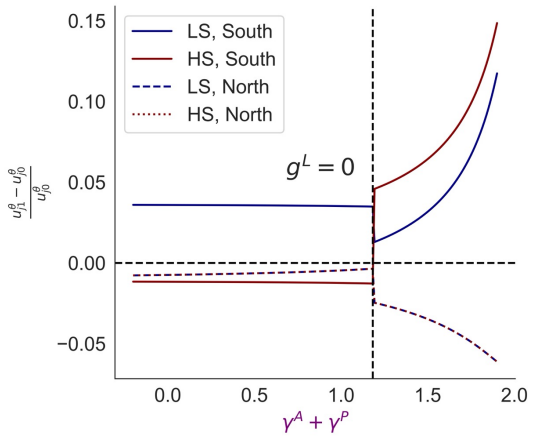


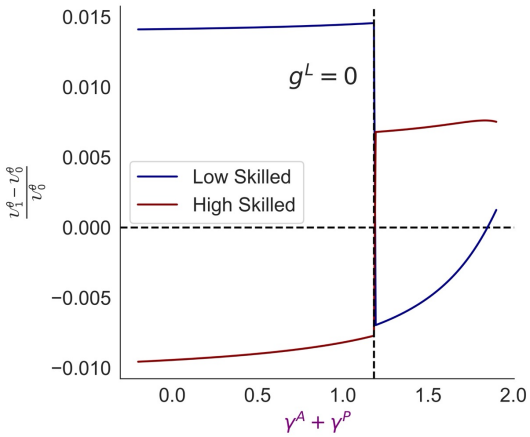
Figure 3 plots the effects of the regional transfer on welfare. The left panel plots the effects on utilities in the South and the North for different types of workers, u^θ_j. The right panel plots the effects of the policy on aggregate welfare, defined as $\mathcal{U}^\theta_t = [\sum_j (u^\theta_{jt})^{1/\sigma}]^\sigma$.

FIGURE 3: WELFARE EFFECTS

(A) DISTRIBUTION



(B) AGGREGATE WELFARE



Utility of the low skilled workers in the South always increases (solid blue line in the left panel), since they are the political majority in the region that receives the transfer. When they capture the transfer (i.e. when $g_{Cap} > g_{Give}$), the aggregate utility of low skilled workers (blue line in the right panel) also increases, whereas this is not always the case when they allocate the transfer to the high skilled workers. The dashed lines in the left panel show that, in all cases, utility in the North decreases for all types of workers, because the North has to foot the bill.

The policy is generically inefficient in terms of aggregate utility. Indeed, simulations show that, when congestion dominates agglomeration, a place blind transfer to the low skilled is Pareto improving compared to the politically captured place based one. The reason is that, when congestion is high, sorting is inefficient and creates deadweight losses. When the political majority in the South captures the transfer, it disregards such losses since they only care about their private benefit and also do not internalize the aggregate effects of the policy, since each city is atomistic.[11] Thus, a place blind transfer to the low skilled workers, which does not influence migration decisions, manages to yield a higher utility while keeping the loss for high skilled workers constant.

I now turn to an analysis of the European Cohesion Policy, which tests the model by providing evidence that political considerations matter in the allocation of funds.

2 Institutional Background of the EU Regional Policy

Before turning to the empirics, I briefly describe the institutional context surrounding the Cohesion Policy, which shows that it is an ideal testing ground for the model.

[11] The main margin, however, is the first. Simulations where cities are big enough for voters to internalize aggregate effects yield similar results.

Since its first steps, the European project has struggled with economic disparities, which have always been seen as a threat to the well-functioning of the single market and to politically unity. As such, policies targeted at decreasing these differences have always occupied a prominent role, as the first two paragraphs of article 174 of the Treaty on the Functioning of the European Union eloquently illustrate:

> *In order to promote its overall harmonious development, the Union shall develop and pursue its actions leading to the strengthening of its economic, social and territorial cohesion.*
>
> *In particular, the Union shall aim at reducing disparities between the levels of development of the various regions and the backwardness of the least favoured regions.*

To achieve these key outcomes, the European legislator has often reverted to place based policies as a natural tool to decrease regional differences and, not surprisingly, the EU regional policy has always occupied a sizable portion of the EU budget. For instance, between 2014 and 2020, it accounted for 34% (€371B) of the overall budget.

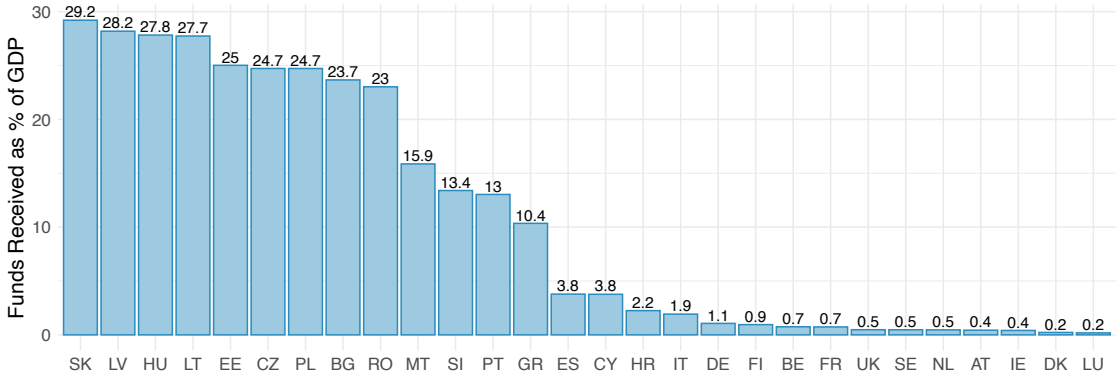
Such policy is implemented through the Directorate-General (DG) for Regional Policy and the DG for Employment, Social Affairs and Inclusion, which operate through several funds that disburse resources to regions across Europe. The overall budget and the regional allocations are defined by the EC at a 7-year cadence, where each interval is denoted as programming period (PP). In this paper I focus on the 2007–13 PP, which is the only one for which complete data on EU payments at the regional level and disaggregated by thematic content is available.

In PP 2007-13, the entirety of the EU regional policy was administered through five "European structural and investment funds".[12] These are jointly managed by the EC and the member states and focus on 5 areas: *i)* research and innovation, *ii)* digital technologies, *iii)* supporting the low-carbon economy, *iv)* sustainable management of natural resources, *v)* small businesses.

Together the budget for these funds was of €347B, 35.7 % of the total EU budget for that period. This amount results in sizable investments for many member states relative to their GDP. Figure 4 shows the amount invested by the EU regional policy in each member state over the 2007–

[12]The funds, along with their description from the EC website, are the following. *i)* European Regional Development Fund (ERDF): "promotes balanced development in the different regions of the EU". *ii)* European social fund (ESF): "supports employment-related projects throughout Europe and invests in Europe's human capital – its workers, its young people and all those seeking a job". *iii)* Cohesion fund (CF): "funds transport and environment projects in countries where the gross national income (GNI) per inhabitant is less than 90% of the EU average". *iv)* European agricultural fund for rural development (EAFRD): "focuses on resolving the particular challenges facing EU's rural areas". *v)* European maritime and fisheries fund (EMFF or EFF): "helps fishermen to adopt sustainable fishing practices and coastal communities to diversify their economies, improving quality of life along European coasts". For the 2007-13 programming period the recipient countries of the Cohesion Fund were: Bulgaria, Cyprus, Czech Republic, Estonia, Spain (on a transitional basis), Greece, Hungary, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia and Slovenia.

FIGURE 4: FUNDS RECEIVED BY EACH COUNTRY THROUGH THE ERDF, ESF, AND CF FUNDS BETWEEN 2007 AND 2013 AS A FRACTION OF GDP IN 2007



13 period, as a fraction of its GDP in 2006.[13] Strikingly, for nine member states this figure is more than 23%—with Slovakia reaching 29.2%.

In deciding the grand allocation of funds to different regions, the EC pursues three "objectives" through its regional policy. The "convergence objective", the "regional competitiveness and employment objective", and the "European territorial co-operation objective". The convergence objective "aims to stimulate growth and employment in the least developed regions", also known as "Objective 1" regions, and has the lion share of the overall budget (81.5%). Regions that are assigned to this objective have either a regional GDP which is lower than 75% of the EU average or are situated in member states with a GNI which is lower than 90% of the EU average. If not assigned to such objective, a region is assigned to the "regional competitiveness and employment objective", which "aims to reinforce regions' competitiveness and attractiveness as well as employment". These regions are also known as "Objective 2" regions. Finally, regions at the border of multiple EU countries are also eligible for the "co-operation objective", which aims at reinforcing cross-border cooperation between member states.

Although the EC centrally sets the amount of transfers to each region, the practical implementation is left to local authorities; and involvement of local regional partners has been one of the key principles of EU regional policy since 1988. In particular, the EC operates by developing a partnership agreement with each member state, where they contract over the national thematic objectives and priorities for the programming period (known as National strategic reference framework, NSRF), a non-detailed[14] plan for the implementation of such objectives, and an outline of the authorities that will be responsible for implementation and monitoring.

Each partnership agreement then gives rise to a series of "investment programmes" and de-

[13] Limited to investments made through the ERDF, CF, and ESF—for which I have data.

[14] Except for interventions above €50M (€25M for environment projects), which have to be "indicatively listed".

scribes the budget and one or more managing authorities (MAs) responsible for each program. Programs can be regional, national, multi-national, or multi-regional. A unique identifying code (CCI) is then assigned to each program, and its management is left completely to the MAs—with the member state itself being responsible for monitoring. At this stage, it is upon such authorities to write open competitions for projects, and to decide in which sectors to invest and which firms to subsidize. In this regard, the 2007–13 PP marked a novelty compared to previous PPs, since it entailed less control over the specific projects meant to implement the policy objectives.[15]

These characteristics make the EU Cohesion Policy an exact setting in which to test the implications of Section 1: both in reality and in the theoretical formulation, the federal authority (the EC) sets the amount of transfers to the various regions but essentially leaves to local authorities (member states and regions) the actual choices of how to invest such funds. To understand whether workers who are locally more abundant will be favored by managing authorities that cater to local voters, it is then enough to construct two measures. First, a measure that captures how funds are spent, which will be given by the thematic area of investment. Second, a measure of whether the MAs are more likely to cater to the local electorate, which will be given by whether they are locally voted or centrally appointed.

3 Data

The main dataset consists of the record of interventions made by the EU through the ERDF, ESF, and CF funds during the 2007-13 PP[16] in 27 EU countries. Such records are assembled by the EC starting from the end-of-period closure reports compiled by the regional and national managing authorities. The EC describes the dataset as "the best approximation of thematic content of what was financed during 2007-2013", and it contains records of payments made through 318 unique investment programs to 257 NUTS2 regions.[17] The amount of investments recorded in the data totals €368B. Among these, €283B are recorded at the regional (NUTS 2) level or lower. From

[15] See the commentary by the European Commission (2007): "*The programmes are built around a Member State's priorities. Details concerning management (as well as project selection criteria) are defined at regional and national level and do not feature in the programming. The programming complement which existed in the past thus no longer exists.*", where the emphasis is mine.

[16] Note that the online description of the dataset states that only payments made through the ERDF and CF funds are available. By analyzing the identifying codes of the programs (CCIs) however one can note that the dataset contains also payments made through the ESF fund.

[17] As anticipated, the entirety of the EU regional policy was implemented through 5 different funds and not only through the ERDF, the ESF, and the CF. Figure O.A.1 in the Appendix shows the total expenditure by fund. As the figure shows, among the €437B spent by the EU in the regional policy for the 2007-13 PP, €340B were spent through the ERDF, ESF, and CF fund (77.7%). More importantly, the funds not available in the dataset cover only investment that are within the realm of the EU agricultural policy. That is, my dataset covers the entirety of the EU regional policy investments in non-farm activities in PP 2007-13.

this sample, I drop cross-border cooperation funds, which are a specific kind of fund for provinces at the border of member states and account for 2.2% of the total, and I drop one-region countries, (6.2% of the total amount invested) since there is no within-country variation I can exploit. The final sample consists of €265B distributed through 299 programs across 255 NUTS2 regions.

Each record in the data reports a payment to a geographical region made through a given investment program and further disaggregated along the following dimensions: the economic sector which received the investment (if applicable), the "priority theme" of the intervention, the form through which the investment was financed (whether through loans, non-repayable aids, or venture capital), the type of territory within the NUTS region receiving the investment (whether urban, sparsely populated, rural, etc..). In the remainder of the paper, I refer to the set of these dimensions as "payment-bin". That is, each payment-bin is a combination of the program code (CCI) that originates the payment, the type of territory targeted, the sector targeted, the priority axis, and the type of financing. Each row of the dataset is hence uniquely identified by a combination of a target region and of a payment-bin.

The categorization of investments across sectors is done according to a "simplified" 1-digit NACE Rev. 2 categorization, while that for priority themes is across 86 codes which are nested in 17 main categories.[18] Unfortunately, the data aggregates all the amount invested during the whole PP, without disaggregating by time of investment. Tables O.A.2 and O.A.3 report the total amount of funds invested in each priority code and each target sector, respectively.

I complement this dataset with another one that reports the outcomes achieved through each CCI, which allows me to measure in a granular enough way the effects of the policy. This was compiled by the European Commission as part of an ex-post evaluation of the interventions under the ERDF and CF for 2007–13, and reports several indicators such as the number of jobs created, kilometers of additional road built, number of startups created, and similar. Among these, the only indicator with a reliably high quality and that is non-missing for most programs is the total number of jobs created as a result of the intervention. Since the Commission only collected this data for the ERDF and the CF, interventions under the ESF are not covered.

Macroeconomic and demographic data at the NUTS 2 level come from the Annual Regional Database of the EC's Directorate General for Regional and Urban Policy (ARDECO) and from

[18] In particular, the categorization of the target sector and the priority code of every payment is done according to regulation 1828/2006 (Council of European Union, 2006), Annex II. The 17 main categories for "priority themes" are: *i)* research and technological development (R&TD), innovation and entrepreneurship, *ii)* information society, *iii)* transport, *iv)* energy, *v)* environmental protection and risk prevention, *vi)* tourism, *vii)* culture, *viii)* urban and rural regeneration, *ix)* increasing the adaptability of workers and firms, enterprises and entrepreneurs, *x)* improving access to employment and sustainability, *xi)* improving the social inclusion of less-favoured persons, *xii)* improving human capital, *xiii)* investment in social infrastructure, *xiv)* mobilisation for reforms in the fields of employment and inclusion, *xv)* strengthening institutional capacity at national, regional and local level, *xvi)* reduction of additional costs hindering the outermost regions development, *xvii)* technical assistance.

Eurostat. For all variables, I convert the NUTS categorization to its 2006 version, which is the one used in the funds expenditure reports aggregated by the EC.[19] In particular, the data on the education levels of the local population is taken from Eurostat, which reports the number of economically active residents by ISCED brackets.[20] In line with the literature, I define as high skilled all individuals with tertiary education and as low skilled all others.

As anticipated, the model makes two predictions. First, that funds will be spent differently according to the local composition of the electorate and the political incentives faced by the manager of the fund. Second, that this has effects on growth. Thus, my main variables of interest concern how funds are spent, who is in charge of their expenditure, and what are the effects of the interventions. Before concluding this Section, I turn to the description of these three measures.

3.1 Management Authorities

To gather data on the types of MAs managing each fund I first collect data on the list of MAs associated to each CCI. For ERDF funds, this can be scraped from the EC website. For other funds, it has to be manually searched program by program. Then, I collect information on each MA, either through their websites or other web searches, and categorize them as either being linked to the local government or not. Management authorities linked to the local government are either offices of the local government, or external agencies where the board is presided or nominated by the local government. Those that are not linked to local governments, instead, can either be offices of the central government—for instance prefectures in France, local offices of central ministries in Spain, "growth delivery teams" in England—or they can be external agencies whose board is nominated by the central government.

Appendix Table O.A.1 describes, for each country, the amount invested through each type of program, either national or regional, and, when regional, the amounts managed by the local government or by the central one (national programs are always managed by central governments). Panel A of Appendix Figure B.4 reports for each region whether funds were invested mainly through regional programs, national ones, or a mix of both. Panel B reports whether regional programs were managed by centrally appointed authorities or local governments.

[19] Given the various changes of borders and renaming of regions, mapping across different version of the NUTS categorization is difficult in practice. I use the NUTS converter designed by the Joint Research Center of the EC within the Urban Data Platform. The converter is based on a set of precalculated look-up matrices that establish the relationship between regions of different NUTS versions by computing the extent of the geographical intersection across such regions.

[20] In particular, the ISCED brackets reported are levels 0-2 (less than primary, primary and lower secondary education), levels 3-4 (upper secondary and post-secondary non-tertiary education), levels 5-8 (tertiary education).

3.2 Thematic Content of Investments

The thematic areas of investments allow me to capture differences in the types of place based policies implemented in different regions. In particular, I make use of six priority codes which clearly refer to technological development, innovation, and R&D (abbreviated as TD&I). These projects are either subsidies to firms for technological development of their production processes and for innovation, or direct investment in research centers and firms directly linked to innovation. They amount to 12.3% of all funds recorded in my data and serve as a good proxy for projects with asymmetric benefits across types of workers, since they are likely to benefit high skilled workers more than low skilled ones. Furthermore, as anticipated, such types of investments are regarded as key drivers of growth, thus making the analysis interesting on its own right.

Online Appendix Table O.A.2 reports the total amount of funds invested by priority code, and I indicate my categorization for each priority code. The key one that refers to spending in TD&I is denoted as "TD&I subsidies to firms and TD&I investments". Figure B.2 provides descriptive evidence at the NUTS2 level of the main variables analyzed in the next sections: the fraction of funds invested in innovation (Panel A) and the fraction of low skilled workers (Panel B).

3.3 Outcomes

Data on outcomes include several indicators that measure the effects of the policy. These are directly reported by MAs and then vetted by the Commission. For 2007–13, reporting was voluntary but the Commission exerted significant moral suasion for MAs to at least report the total number of jobs directly created as a result of the program. Hence, this indicator is available for 190 CCIs out of the 215 funded via the ERDF and CF, covering €170 billions, or 76% of all the ERDF and CF funds in my main dataset. Based on conversations with EC officials, the EC put considerable effort into validating and requesting this particular indicator, which alleviates concerns of selection into reporting and data quality—something that is not true for other indicators in the dataset.[21]

From now on, I hence focus on report of jobs created through each CCI. As a sanity check of the data, the median across CCIs of the implied cost per job in Italy is €147,000,[22] which falls within the causal estimates by Cerqua and Pellegrini (2014) (€60-100,000) and by Cingano et al.

[21] These are indicators that are missing for a higher number of projects and for which the EC did not insist on reporting. Such indicators are, for instance, the number of research projects started (available for 149 CCIs, 69% of investment), number of start-ups supported (for 118 CCIs, 54% of investment), number of direct investments in SMEs (for 130 CCIs, 60.4%), and others with even scanter availability.

[22] The mean across Italian CCIs is higher (€300,000), since the distribution has four outliers at more than €750,000 per job. These are: the regional program for Calabria, the one for Sardinia, a national program for infrastructure development in the South and another national program to increase safety and the rule of law in the South. Despite these outliers, the overall sum of funds invested in Italy over the sum of jobs created yields a figure of €184,000—in line with the median.

(2022) (€200,000), who study the impact of the Law 488/92, a program of investment subsidies implemented in Italy between 1992 and 2007 and partially funded through the same funds I study. As in Cingano et al. (2022), this data also shows a North-South gradient where the median cost per job is €223,000 in the South and €140,000 elsewhere. The median cost per job including also all other countries is €147,000.

A substantial disadvantage of the data is that it is at the CCI level, rather than at the CCI-region level. Thus, for CCIs that span multiple regions I cannot study the relationship between region-level characteristics and outcomes of the program. When I need to do such analysis, I thus focus on CCIs that are concentrated in only one region, which I define as having more than 90% of their spending in one region. This results in 141 CCIs covering €86.7 billions, only half of the investments for which data on jobs created exists and only 38% of the ERDF and CF investments covered in my main dataset on thematic expenditures. Within these 141, regional data is non-missing for 139. For these programs, Panel A of Appendix Figure B.3 reports the map of the log of the jobs created per €1 million invested. Panel B instead reports the distribution of this same variable but across all programs, distinguishing between those that can be apportioned to only one regions and the others.

Appendix Table B.2 reports an essential summary of the available data.

4 Empirical Analysis

In this Section, I test and provide evidence for the two central predictions of the model, assuming that primitives are such that low skilled workers want to capture the regional transfer (i.e. (11) does not hold). First, the model predicts that in regions with a higher fraction of low skilled residents, funds are less likely to be invested in projects that benefit the high skilled workers. For this to be a political story, this should happen only when funds are managed by local governments—since those authorities are more subject to local political pressure. This prediction is confirmed in Section 4.1.

The second prediction is that this political wedge matters for growth. As anticipated, while the data allows a precise test of the first prediction, the second one is considerably harder to test. The ideal test would use regional data and study the heterogeneous effects of the policy across different managing authorities and local composition of the workforce. However, given the coarseness of the policy, it is hard to do so credibly.[23] In Section 4.2 I get at this test in two ways. First, to get

[23] In itself, assessing the effects of the Cohesion Policy on growth has been the focus of a large literature that does exclusively this and faces the challenge that the policy is endogenous, has been active for thirty years, and is rolled out in seven years intervals (see, for instance, Sala-i-Martin, 1996; Boldrin and Canova, 2001; Becker et al., 2010; Mohl and Hagen, 2010; Pellegrini et al., 2013; Becker et al., 2013; Ciani and de Blasio, 2015; Barone et al., 2016; Giua, 2017; Percoco, 2017; Bachtrögler and Hammer, 2018; Bachtrögler et al., 2020; Albanese et al., 2021). Most

at an indirect measure of the effects of the policy on growth I use the data on jobs created by each program described above. This evidence, unfortunately, does not come directly from migration, as in the model, but is the best available proxy on the effects of the policy. Second, I review several pieces of evidence from the literature that offer evidence consistent with my model.

4.1 Expenditure of Funds Under Political Incentives

To test whether funds were slanted towards low skilled workers in regions where the latter had political power over their expenditure, I focus on investments in innovation, technological development, and research as proxies for investments that benefit high skilled workers relatively more than low skilled ones. My main dependent variable of interest is thus a dummy indicating if a payment-bin falls within the priority codes linked to subsidies to firms for TD&I or direct investments in TD&I and research centers (detailed in Table O.A.2), and I use the following specification:

$$Y_{ij} = \alpha + \beta \text{LS}_j + \sum_m (\gamma_m + \beta_m \text{LS}_j) \times \mathbb{1}(\text{MA}_i \text{ is of type } m) + \delta \mathbf{X}_i + \tau \mathbf{R}_j + \varepsilon_{ij} \qquad (12)$$

Where i indicates the payment-bin and j indicates the target region. Y_{ij} is a dummy equal to one if the payment-bin i in region j is within a priority code linked to TD&I. $\mathbf{X}_i$ is a set of payment-bin-level controls and $\mathbf{R}_j$ is a set of NUTS2-level controls. LS_j is the main regressor of interest, namely the fraction of low skilled workers in region j in 2007 (the first year in which funds have been disbursed),[24] interacted with the type of MA that manages payment i. As anticipated, programs can take three forms: national programs managed by a national government, regional programs managed by a centrally appointed authority, or regional programs managed by a local government.

The payment-bin-level controls are: a dummy for whether the directorate general responsible for the program was the DG for Regional Policy or the DG for Employment, territory fixed effects (i.e. dummies for whether the targeted territory is urban, rural, mountainous, etc..), form of finance fixed effects, sector fixed effects (controlling for the economic sector targeted by the payment-bin), and a dummy indicating the "Objective" pursued through the fund (as discussed in Section 2).

Since lower investment in TD&I may be the artifact of economic conditions correlated with the share of low skilled workers, rather than of political considerations, I flexibly condition on

of these papers deal with the endogeneity problem by employing an RDD approach that exploits threshold rules for the allocation of funds. However, it is hard to credibly apply this strategy here, because the model does not discipline the average effect of the policy but rather its heterogeneity across regions with many vs. few low skilled workers and those where funds are managed mostly nationally vs. locally. A triple interaction that is too demanding when there are only 56 regions in a 10 p.p. window around the threshold for assignment of "Objective 1" status, and hence of a higher portion of funds.

[24] Throughout the paper, I always use macroeconomic regional data from 2007 even though a better choice would be to use data from 2006 (before the start of the investment cycle). Using data from 2007 however allows me to have 10 more NUTS2 regions for which I have available data, compared to 2006.

regional log GDP per capita, sectoral composition of employment, and log of total population. Such controls are included in different forms across specifications: linearly, through a third-degree polynomial, and by taking group-specific fixed effects (grouping regions based on GDP and sectorial composition of employment).[25] Sectorial composition of employment is always constructed from the ARDECO database, which reports the fraction of employees across six broad economic sectors[26] over all employees in a region. In addition to economic characteristics, the vector $\mathbf{R}_j$ includes also country fixed effects and two dummies indicating whether the region received funding under the "convergence objective" and under the cross-border "co-operation objective".

Finally, to dispel any concern that the relationship is driven by region-level unobservables, I exploit regions where multiple funds are active and include NUTS2-level fixed effects. The interpretation of this specification is that it reports the within region difference in the propensity to invest in TD&I between local governments and other management authorities as a linear function of the fraction of low skilled workers.

Observations are weighted by the ratio between the amount invested in region j through payment i over the total amount invested in region j, so to give more weight to payments that cover a sizable portion of the budget allocated to the region. When there is no variation on the right hand side at the payment-bin-level (as in Column 1), weighting by the ratio of each payment on overall investment is identical to aggregating the data at the regional level and using as dependent variable the fraction of funds invested in TD&I in region j. Finally, since the main variation in the variable of interest is at the NUTS2 level, standard errors are clustered at such level.

Table 1 shows results from this specification. Column (1) reports the unconditional correlation and I successively include controls and interactions in the next columns. In column (2) I add an interaction for whether the program is regional or not, without distinguishing between regional programs that are managed by locally appointed authorities and centrally appointed ones. Column (3) adds linearly the regional level controls (GDP, population, and sectoral employment), the dummies for the objectives covering the region, and country fixed effects. It shows that there is no statistically significant relationship between the fraction of low skilled workers and the fraction of investment in TD&I when one looks at all regional and national programs without distinguishing whether they were managed by local or centrally-appointed authorities.

In column (4) I add the interaction that distinguishes across types of managing authorities. This

[25] When grouping NUTS based on their economic characteristics, I create two grouping variables for each region. The first bins NUTS regions based on four quintiles in the overall distribution of GDP per capita. The second variable clusters regions based on the sectorial composition of employment. To cluster regions based on sectorial composition, I use k-means clustering on the six variables reporting the share of regional employment in each sector to construct 4 sector clusters.

[26] These are: *i)* Agriculture, Forestry and Fishing, *ii)* Industry - excluding Construction, *iii)* Construction, *iv)* Wholesale, Retail, Transport, Accommodation and Food Services, Information and Communication *v)* Financial and Business Services, *vi)* Non-market Services.

TABLE 1: INVESTMENT IN TECHNOLOGICAL DEVELOPMENT AND INNOVATION VS FRACTION OF LOW SKILLED WORKERS, BY TYPE OF MANAGING AUTHORITY

	Dependent variable:							
	Tech. Dev. and Innov.							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fraction Low Skilled Workers	-0.588^{***}	-0.328^{**}	-0.379	-0.294	0.097	0.077	0.023	
	(0.102)	(0.153)	(0.240)	(0.248)	(0.254)	(0.226)	(0.234)	
Regional Program		0.216	0.059	-0.187	0.039	-0.008	-0.073	-0.037
		(0.165)	(0.173)	(0.193)	(0.197)	(0.176)	(0.180)	(0.194)
Reg. Prog. × Managed by Local Govt.				0.471^{**}	0.689^{***}	0.455^{**}	0.414^{**}	0.735^{**}
				(0.217)	(0.203)	(0.193)	(0.192)	(0.285)
Low Sk. × Reg. Prog.		-0.125	-0.084	0.190	-0.090	-0.099	-0.019	-0.064
		(0.208)	(0.220)	(0.251)	(0.257)	(0.229)	(0.235)	(0.252)
Low Sk. × Reg. Prog. × Local Govt.				-0.501^{*}	-0.795^{***}	-0.510^{**}	-0.459^{*}	-0.911^{**}
				(0.292)	(0.271)	(0.252)	(0.249)	(0.361)
Country FE			✓	✓	✓	✓	✓	✓
Payment Controls			✓	✓	✓	✓	✓	✓
Region Obj. FE			✓	✓	✓	✓	✓	✓
Regional Pol.			1	1	3	3	3	
Target Sector FE						✓	✓	✓
Sector Comp. FE							4	
GDP Group FE							4	
Region FE								✓
$\mathbb{E}$(Y)	0.198	0.198	0.198	0.198	0.198	0.198	0.198	0.198
$\mathbb{E}$(frac. Low Skill)	0.763	0.763	0.763	0.763	0.763	0.763	0.763	0.763
# of Regions (NUTS2)	253	253	253	253	253	253	253	161
Observations	42,954	42,954	42,954	42,954	42,954	42,954	42,954	27,703
R^2	0.016	0.032	0.163	0.168	0.175	0.262	0.263	0.331

Note: the table reports results from a WLS regression of a dummy indicating whether a payment i to region j was invested in innovation on the fraction of low skilled workers in region j, allowing for heterogeneous effects across types of authorities managing the funds, and controlling for various covariates at the payment level and at the region level. Controls are constructed and included following the discussion in Section 4.1. Each observation is weighted by the ratio between the amount invested in region j through payment i over the total amount invested in region j. Parentheses report clustered standard errors at the NUTS2 level.

shows that, when local governments manage the funds, there is a negative relationship between the fraction of low skilled workers and the probability that a fund is invested in TD&I (last line of column 4). Columns (5) to (7) add flexible controls and sectors FE (simplified 1-digit aggregates), which drives the uninteracted β towards zero, while the interaction for funds managed by the local government stays negative and significant. Conditioning on sectors FE suggests that the relationship is driven by local governments choosing less technologically advanced and innovative projects within sectoral aggregates, rather than less technologically advanced and innovative sectors. This further dispels the concern that the results are driven by lack of scope for TD&I investments, rather than political opportunity.

Finally, Column (8) adds regional fixed effects and shows that, even partialing out regional-level characteristics, the coefficient for local governments stays negative and significant. This can be interpreted as saying that, across regions, the within-region difference in investment in TD&I between local governments and other managing authorities is increasing with the fraction of low

skilled workers. That is local governments' investment in TD&I, compared to that of national governments within the same region, decreases as the fraction of low skilled workers increases.

Choosing Column (5) as my preferred specification, the implied magnitude is that a one standard deviation increase in the fraction of low skilled workers (8.6 p.p.) corresponds to a 6.4 p.p. decrease in the fraction of funds invested in TD&I in a given program when this is managed by local governments. This is 40% of the simple average of such fraction across programs (16.3%).[27] The estimate is zero if the program is regional but managed by centrally appointed authorities. In monetary terms, taking the average investment for an "Objective 1" fund (€525 million), this estimate implies that local governments in regions with a one standard deviation higher fraction of low skilled workers spend €33 millions less in TD&I.

Towards which category of spending are local governments of low-skilled intensive regions substituting to? And is investment in TD&I the only category on which they are spending less? To answer these questions, I group all the 86 priority codes contained in the data in 11 categories[28] and repeat regression (12) with each possible investment category as a dependent variable. Appendix Figure B.5 reports the β_m and its associated 95% confidence interval for the three types of programs and MAs and for all possible categories, choosing as specification the one in Column (5) of Table 1.

In line with the theoretical predictions, TD&I is the category for which the regression coefficient for local governments is most negative. The only other category for which the coefficient is negative and statistically significant is large transport infrastructure, which is not surprising if low-skilled political majorities are more likely to be employed in non-tradable sectors or small firms with low export ability. As for the first question, the Figure shows that local governments of regions with many low skilled workers invest more in other subsidies to firms excluding those for technological development and innovation. This reinforces the interpretation that they move away from technologically-intensive investments and instead subsidize low-knowledge intensive projects. Also in this case, the effect is present only for local governments and not for the central government, suggesting that it is politically motivated.

4.1.1 Interpretation and Alternative Mechanisms

Summing up, the analysis shows that, conditional on regional characteristics, country fixed effects, and payment-level controls, EU funds are less likely to be spent in TD&I in regions with many low

[27] That is, averaging across different CCIs. The average reported in Table 1 is a simple average across single payment-bins.

[28] These are: TD&I subsidies to firms and TD&I investments; Support to firms, excluding TD&I subsidies; Technological infrastructure; Large transport infrastruct.; Local infrastructure; Energy; Environmental protection; Tourism; Culture; Labor market policies; Other. All priority codes referring to each category, as well as total amounts invested, are reported in Online Appendix Table O.A.2.

skilled workers, and more likely to be spent in other subsidies to firms. Furthermore, these correlations vanish if funds are managed by the central government and, instead, are strong for funds managed by a set of MAs that includes the local government. This confirms the first prediction of the model: since local workers benefit less, relatively to high skilled workers, from investments in technological development and innovation, they demand a lower fraction of all projects to be invested there.

Two main concerns, however, might challenge this interpretation. First, investment in TD&I may be a poor proxy for projects that benefit the high-skilled workers more than the low-skilled ones, as a better one would be investment in firms that employ more high-skilled workers than low-skilled ones. Second, another possible explanation of the results is that local governments are actually implementing the economically optimal investment, which happens to favor the local political majority, and that, on the contrary, national authorities are implementing a "one-size-fits-all" solution. That is, the correlation is the artifact of the higher scope for investments in innovation in regions with high skilled workers, rather than of a politically slanted allocation by local authorities.

To dispel the former concern, I focus on a case study for Italy where I have access to firm-level payment data that allows me to study the probability that funds go to firms that are more likely to employ high-skilled workers. The results, presented in Appendix Section B.2, mirror those presented above and show that local governments seem more likely to subsidize low-knowledge intensive firms in regions with many low skilled workers, while the national government does not.

As for the second concern, three arguments independently counter the alternative interpretation put forth. First, a "one-size-fits-all" approach by centrally appointed authorities should encompass low variability in the dependent variable across regions, conditional on country fixed effects, when funds are managed by such authorities. However, comparing the distributions of the residuals from my region-level specification (19) between the sample of funds managed by local governments and the sample of nationally managed ones shows comparable degrees of variability, as illustrated in Figure O.A.2 in the Online Appendix. Furthermore, it is unclear why nationally appointed managing authorities that are locally based (e.g. prefects in France or "growth delivery teams" in England), should implement a one-size-fits-all solution, since each managing authority manages a single regional program that is customized for its specific region.

Second, an economic rationale for such types of investments should be captured, at least in part, by flexible enough controls for local economic characteristics of the region, such as local GDP, the sectorial composition of employment, and population. However, when I condition nonlinearly on such variables, the negative relationship between the fraction of low skilled workers and the likelihood of investing in innovation becomes stronger for local governments vs. other managing authorities, rather than weaker. Similarly, the relationship survives even when employing regional

fixed effects, which allows me to control for observable and unobservable regional characteristics by comparing allocations by national and local authorities within each region.

Finally, if local authorities were pursuing the economically optimal investment, one would expect growth as a result of such investments. On the contrary, Becker et al. (2013) show how the Cohesion policy (in years preceding those analyzed here, however) had positive causal effects on growth only in regions with many high skilled workers and good political institutions. Thus, any explanation that the facts presented in this Section are the artifact of an economically optimal allocation, rather than the politically motivated one, must reconcile this with a failure of the policy in fostering growth in regions with many low skilled workers. The next Section, to which I now turn, lends further empirical validity to this argument by showing that regional governments in low skilled intensive regions generate fewer jobs as a result of their investments, and that investments in innovation are correlated with better economic outcomes. Furthermore, this latter relationship is driven by Objective 1 regions, which shows that TD&I investments are especially useful in poorer areas. The opposite of there being no scope for them. I also review other examples of failures of such kind of policies from the literature, which can be reconciled by the theory.

4.2 Political Incentives and Growth

Are political incentives standing in the way of growth? Is lower investment in technological development and innovation associated with worse economic outcomes? I finally turn to these questions and to the second prediction of the model, namely that the political goals pursued by local governments of low-skilled intensive regions are at odds with economic development. I use the data on jobs created by each investment program, described in Section 3.3, and show two results.

First, that investment programs create fewer jobs in regions with many low skilled workers, but (again) only if the funds are managed by regional governments. To show this, I run the following region-and-program level specification:

$$Y_{pj} = \alpha + \beta \text{LS}_j + \sum_m (\gamma_m + \beta_m \text{LS}_j) \times \text{MA}_p \text{ is of type } m + \delta X_p + \tau \mathbf{R}_j + \varepsilon_{pj} \qquad (13)$$

where Y_{pj} is the log of jobs created by program p in region j per €1mil. invested by program p in region j and the remaining terms mirror specification (12). The program level control is the objective pursued by the fund.[29] The region level controls are as in specification (12).

As anticipated in the data section, the data is available only at the program-level, rather than program-region level, and only for ERDF and CF funds. This brings the total number of programs analyzed from 299 to 190, and also presents the challenge of imputing jobs created by a program—

[29] This indicates whether the program is targeted towards objective 1 regions, objective 2 ones, or both.

which can be active in multiple regions—to each region. To obviate this shortcoming, I focus only on the set of CCIs that have more than 90% of the their expenditure concentrated in one region, so that I can impute the jobs created by the program to the region where the program is concentrated, and then consider only the main region where the program is active. This drastically reduces the sample, as already discussed in Section 3.3, from 190 to 139 programs and, differently from previous Sections, in this smaller sample to each region corresponds only one program and vice versa.

TABLE 2: JOBS CREATED AND FRACTION OF LOW SKILLED WORKERS

	Dependent variable:					
	log(jobs created per €1mil.)					
	(1)	(2)	(3)	(4)	(5)	(6)
Fraction Low Skilled Workers	-3.826^{***}	-2.060	-0.071	0.839	0.025	-4.734
	(1.355)	(1.929)	(1.720)	(1.389)	(1.428)	(4.186)
Managed by Local Govt.		3.459^{*}	4.436^{**}	5.270^{***}	4.974^{***}	-0.052
		(1.997)	(1.965)	(2.022)	(1.911)	(2.687)
Low Sk. × Local Govt.		-4.382^{*}	-6.091^{**}	-7.323^{***}	-6.917^{***}	-0.408
		(2.594)	(2.500)	(2.573)	(2.441)	(3.419)
Fund Obejective FE			✓	✓	✓	✓
Regional Polynomial			1	3	3	3
Sector Comp. FE					4	4
Country FE						✓
$\mathbb{E}(Y)$	1.94	1.94	1.94	1.94	1.94	1.94
$\mathbb{E}$(frac. Low Skill)	0.76	0.76	0.76	0.76	0.76	0.76
Observations	139	139	139	139	139	139
R^2	0.064	0.085	0.448	0.611	0.639	0.755

Note: The table reports OLS results from a regression of log(jobs created per €) by a given investment programme in a given region on the fraction of low skilled workers in that region, allowing for heterogeneous effects across types of authorities managing the program. Regional controls are constructed and included following the discussion in Section 4.1. Parentheses report heteroskedasticity-robust standard errors. The sample is made only by funds that can be apportioned uniquely to one region, as described in Section 3.3.

Results are reported in Table 2. Column (1) shows the unconditional correlation between jobs created and the fraction of low skilled workers, showing a negative relationship, while Column (2) adds the usual interactions by MA, which shows that this negative relationship is driven by local governments.[30] The successive columns progressively add controls, showing that the relationship is robust (and actually becomes stronger), when controlling for economic characteristics. This pattern is identical to the one shown in Table 1, with the only caveat that the relationship does not survive to the inclusion of country fixed effects.

[30]Note that, since I am restricting to CCIs that are active in only one region, the sample is made exclusively of regional programs. Thus, the omitted dummy is whether the program is regional but managed by a central authority, as I do not have national programs managed by central authorities.

As the map in Figure B.4a shows, the sample is too small to exploit within-country variation, and, as discussed above, this is due to the fact that I need to restrict attention to funds that are active only in one region—in addition to the fact that outcomes are available only for ERDF and CF funds, and not for ESF ones.

To focus on a larger sample that also allows me to exploit within-country variation, I run a program-level specification that relates the number of jobs created by each program with the amount invested in innovation and technological development. This leads to the second result of this Section: at the program level, higher investments in innovation and technological development are correlated with a higher number of jobs created.

To show this, I use the following program-level specification:

$$\log(Y_p) = \alpha + \beta \times \%\text{ invested in Tech. Dev. \& Innov.}_p + \tau \mathbf{X}_p + \varepsilon_p \tag{14}$$

where Y_p is the number of jobs created by the program per €1mil. invested, and $\mathbf{X}_p$ are program-level controls such as country fixed effects and the objective pursued by the program, as described above. Standard errors are robust to heteroskedasticity and, in my preferred specification, observations are weighted by the total amount invested by each program, in order to give more weight to larger programs.

Table 3 reports the results. Column (1) reports the unconditional correlation, while Column (2) adds the controls. It shows that programs with higher fraction of funds invested in technological development and innovation seem to create more jobs. A one SD increase in the fraction of funds invested in TD&I (20 p.p.), corresponds to an increase in 0.2 log-points in jobs created. Column (3) adds interactions by objective pursued, which allows to see heterogeneous effects across groups of regions. This shows that the bulk of the effect is driven by objective 1 regions, for which the coefficient is almost doubled, which suggests that it is especially for such regions that investments in TD&I are most beneficial. Columns (4) to (6) mirror (1) to (3) but report unweighted regression results.

In line with the fact that the restricted sub-sample used in (13) is too small to exploit only within-country heterogeneity, also the results of specification (14) fail to hold when restricting attention to this sub-sample and adding country fixed effects, as Appendix Table B.3 shows. Whereas these results are robust to the inclusion of country FEs when focusing on the entire sample, as shown in Table 3.

4.2.1 Examples from the Literature

The model's predictions on growth are also corroborated by several pieces of evidence found by the literature that studies the effects of place-based transfers on economic development, which the

TABLE 3: INVESTMENT IN INNOVATION AND JOBS CREATED AT THE PROGRAM LEVEL

	Dependent variable:					
	log(jobs created per €1mil.)					
	(1)	(2)	(3)	(4)	(5)	(6)
% invested in Tech. Dev. and Innov.	1.968	0.993**	2.282***	1.532**	0.391	1.157***
	(1.426)	(0.459)	(0.697)	(0.648)	(0.377)	(0.428)
... × Objective 2 fund			−0.644			−1.038
			(1.418)			(0.814)
... × Multiple objective fund			−4.421***			−2.918***
			(1.156)			(1.110)
Obj. 2 fund		0.265	0.222		0.538***	0.720**
		(0.286)	(0.477)		(0.198)	(0.310)
Multiple obj. fund		−1.498***	−0.072		−1.214***	−0.212
		(0.455)	(0.440)		(0.412)	(0.583)
Constant	0.475	2.492***	2.232***	1.550***	2.521***	2.436***
	(0.607)	(0.327)	(0.353)	(0.180)	(0.237)	(0.239)
Country FE		✓	✓		✓	✓
Weighted by tot. € invested in CCI	✓	✓	✓			
$\mathbb{E}(Y)$	1.932	1.932	1.932	1.932	1.932	1.932
$\mathbb{E}$(% inv. in TD&I)	0.25	0.25	0.25	0.25	0.25	0.25
Observations	190	190	190	190	190	190
R^2	0.076	0.514	0.551	0.047	0.658	0.668

Note: the table reports results from WLS and OLS regressions of log(jobs created per €) by a given investment program on the fraction of funds invested in innovation within that program, controlling for country fixed effects and allowing for heterogeneous effects across the objectives pursued by each fund (whether the fund was Objective 1, 2, or multiple). In Columns (1) to (3), each observation is weighted by the total amount invested in each program. Columns (4) to (6) weight each program equally. Parentheses report heteroskedasticity-robust standard errors.

model can rationalize.

For instance, as anticipated above, Becker et al. (2013) find that the positive effects of EU investments are only concentrated in regions with high human capital and good local institutions. The model explains why this can be the case, providing a direct link between the fraction of low skilled workers and growth outcomes. In addition to this, recent work by Cingano et al. (2022) estimate the effects of a place based firm subsidy active in Italy, partially financed by the Cohesion Policy, and finds that the ability of politicians to influence the allocation of resources to different firms is economically costly. They find that, if allocations were to be decided relying only on political discretion, the cost per job would be 55% higher and that this cost is higher in the South. The theory developed here can explain both the absolute level of the political cost and the North-South gradient, since the South of Italy is more intensive in less productive workers.

Other examples of failures of the Cohesion Policy can be explained through the political incentives of the managers of the funds. Albanese et al. (2021) find no effects of the European Regional Development Funds (one of the Cohesion policy's funds) on firms' productivity in the South of

Italy. Similarly, Ciani and de Blasio (2015) find that the European Structural Funds (another Cohesion fund) had a very small impact on employment, population, and house prices. Barone et al. (2016) use evidence from the Abruzzi region and argue that the Cohesion Policy fails at moving regions to higher GDP growth paths. In all these interventions, regional governments were among the key managers of the funds and the recipient regions are all abundant in low productive workers.

Outside of the Cohesion Policy, Felice and Lepore (2017) study the "Cassa del Mezzogiorno", a large place based policy active in the South of Italy between 1951 and 1992, and show that the policy seemed to have had an effect on convergence only until the the early 1970s—the "golden period" of convergence. From 1973 onward, however, convergence completely stopped because, they argue, the policy started following political considerations. What allowed this to happen was a change in the governance model, which, through two reforms in 1971 and 1976, transferred the governance of the Cassa from the central government to regional governments. As the authors put it, "such changes only increased political pressure and nepotism, and resulted in a further dispersion of resources towards unproductive expenditures."[31] The model transparently predicts this and reconciles this evidence, without necessarily resorting to myopia or opportunistic politicians, but simply as an artifact of the political conflict across heterogeneous workers.

Conclusion

This paper discusses political constraints to the implementation of place based policies by developing a model of local voting on regional transfers. Applying the model to convergence-seeking policies, I show that these policies may have unintended adverse consequences when local voters have power over local allocations. This is because such transfers, to be effective, need to redistribute productive workers from richer regions, where they are abundant, to poorer ones, where they are scarce. This requires the policy to favor the minority class in poorer regions, something that is likely to be politically unfeasible. As such, regional transfers may become rent-seeking opportunities for local majorities and, due to spatial equilibrium forces, they might end up increasing, rather than decreasing, differences across space.

I bring the model to the data in the context of the EU's regional policy between 2007 and 2014. I show that investments in projects that foster technological development and innovation are lower in regions with a high share of low skilled workers. In line with the political interpretation of this evidence, this holds only when local governments are among the managers of the funds, but not when centrally appointed authorities are. This also seems to matter for growth, as I show that

[31] In line with this, Buscemi and Romani (2022) find that municipalities politically aligned with the regional government received more funds after the reform, that this is driven by subsidies to local firms, and that it did not produce any positive impacts on long-run outcomes.

investments in technological development and innovation are correlated with a higher number of jobs created per euro as a result of the intervention. I also find that programs managed by regional governments create fewer jobs per euro in regions with many low skilled workers, but that this again does not hold when programs are managed by centrally appointed authorities. In addition to corroborating my theoretical discussion, these results provide new evidence that can explain why the EU Cohesion funds had a markedly heterogeneous effect across regions in fostering growth.

The aim of this paper is thus to offer a novel viewpoint on place based policies by taking into account local political constraints. Voters, even if fully sophisticated, may slant local allocations in ways that are detrimental for the aggregate but beneficial to them, and, due to migration responses, this has costs in terms of productivity that are bore by all workers. These considerations shed light on possible unintended adverse consequences of transfers across space, and offer a new angle under which to analyze past policies and advise future ones. If the implementation of place based policies is left to local governments, political constraints can upend their intended effects.

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A Theoretical Appendix

This Section presents derivations and proofs for Section 1.

A.1 General Statement of Proposition 1 and Proof

The more general statement without requiring that spillovers are constant elasticities is:

Proposition 3 (Voting Solution)**.** *Let $\hat{\tau}_{jt}^{L}$ and $\hat{\tau}_{jt}^{H}$ be the subsidy rates that exhaust the budget t_{jt} in region j at time t when allocating the transfer to low and high skilled workers, respectively. Let $\boldsymbol{\tau}_{jt}^{L} = \left(\log \hat{\tau}_{jt}^{L}, 0\right)$ and $\boldsymbol{\tau}_{jt}^{H} = \left(0, \log \hat{\tau}_{jt}^{H}\right)$ be the vectors of the logs of such subsidy rates. Then there exists an $\alpha \in [0,1]$ such that a voter of type θ will prefer to allocate the transfer to a worker of the other type (denoted as $\neg\theta$), rather than capturing it, if and only if:*

$$g^{\theta} = \frac{\partial \log u_{ijt}^{\theta}(\tilde{\boldsymbol{\tau}})}{\partial \log \tau_{jt}^{\theta}} \log \hat{\tau}_{jt}^{\theta} - \frac{\partial \log u_{ijt}^{\theta}(\tilde{\boldsymbol{\tau}})}{\partial \log \tau_{jt}^{\neg\theta}} \log \hat{\tau}_{jt}^{\neg\theta} \leq 0$$

where $\tilde{\boldsymbol{\tau}} = \alpha \hat{\boldsymbol{\tau}}_{jt}^{L} + (1-\alpha)\hat{\boldsymbol{\tau}}_{jt}^{H}$. If production by each type in each city is finite and strictly positive and migration and spillover elasticities in j are finite, the derivatives are:

$$\frac{\partial \log u_{ijt}^{\theta}}{\partial \log \tau_{jt}^{\theta}} = \underbrace{1}_{\substack{\Delta \text{ in} \\ \text{consumption}}} + \sum_{\theta'=L,H} \underbrace{\left(\gamma_{\theta',\theta}^{A,j,t} + \gamma_{\theta',\theta}^{P,j,t}\right) \cdot \varepsilon_{\theta,\theta'}^{\tau,j,t}}_{\substack{\text{Net spillover for } \theta \text{ from} \\ \text{migration response of } L_{jt}^{\theta'} \text{ to } \tau_{jt}^{\theta}}}; \qquad \frac{\partial \log u_{ijt}^{\theta}}{\partial \log \tau_{jt}^{\neg\theta}} = \sum_{\theta'=L,H} \underbrace{\left(\gamma_{\theta',\theta}^{A,j,t} + \gamma_{\theta',\theta}^{P,j,t}\right) \cdot \varepsilon_{\neg\theta,\theta'}^{\tau,j,t}}_{\substack{\text{Net spillover for } \theta \text{ from} \\ \text{migration response of } L_{j}^{\theta'} \text{ to } \log \tau_{j}^{\neg\theta}}} \tag{15}$$

where $\varepsilon_{\theta,\theta'}^{\tau,j,t} = \partial \log L_{jt}^{\theta'} / \partial \log \tau_{jt}^{\theta}$ is the migration elasticity of type θ', in city j, at time t, with respect to a subsidy to θ.

If spillovers are constant elasticity, and around a competitive equilibrium, g^{θ} is to the leading order:

$$\frac{Y_{j,0}^{\theta}}{t_j} \times g^{\theta} \approx \underbrace{1}_{\text{Direct effect}} + \underbrace{\sum_{\theta'=L,H} \left(\underbrace{\gamma_{\theta',\theta}^{A} + \gamma_{\theta',\theta}^{P}}_{\text{Spillovers}}\right) \cdot \left(\underbrace{\varepsilon_{\theta,\theta'}^{\tau} - \varepsilon_{\neg\theta,\theta'}^{\tau} \frac{Y_{j,0}^{\theta}}{Y_{j,0}^{\neg\theta}}}_{\text{Migration response}}\right)}_{\text{General equilibrium effects}} \tag{16}$$

where $Y_{j,0}^{\theta}$ is the GDP produced by type θ in region j in the competitive equilibrium, and the migration elasticities are functions of primitives only.

Recall the voting problem, which is:

$$\begin{aligned}
\mathcal{P}_i^\theta := \max_{\theta^*=L,H} \quad & u_{ijt}^\theta(\tau_{jt}^L, \tau_{jt}^H, L_{jt}^L, L_{jt}^H) \\
s.t. \quad & \mathbf{L}_t \text{ satisfies } (3) \\
& \sum_j \sum_\theta L_{jt}^\theta z_{jt}^\theta \tau_{jt}^\theta \bar{\tau}_t = \sum_j \sum_\theta L_{jt}^\theta z_{jt}^\theta \\
& L_{jt}^\theta z_{jt}^\theta (\tau_{jt}^\theta - 1) = t_{jt} && \text{for } \theta = \theta^* \\
& \tau_{jt}^\theta = 1 && \text{for } \theta \neq \theta^*
\end{aligned}$$

where the denominator in (3) is taken as fixed by the voter, since the city is small. From now on, I will omit the time subscripts for notational convenience. The voter simply compares utility in the two allocations $\boldsymbol{\tau}_j^L = \left(\log \hat{\tau}_j^L, 0\right); \quad \boldsymbol{\tau}_j^H = \left(0, \log \hat{\tau}_j^H\right)$, accounting for the fact that sizes will be a function of subsidies. Take the log of utility, which is:

$$\log u_{ij}^\theta(\boldsymbol{\tau}) = \log a_j^\theta\left(L_j^L(\boldsymbol{\tau}), L_j^H(\boldsymbol{\tau})\right) + \log \tau_j^L + \log \bar{\tau} + \log z_j^\theta\left(L_j^L(\boldsymbol{\tau}), L_j^H(\boldsymbol{\tau})\right) + \log \varepsilon_{ij}^\theta$$

By the mean value theorem, with $\tilde{\boldsymbol{\tau}} = \alpha \boldsymbol{\tau}_j^L + (1-\alpha)\boldsymbol{\tau}_j^H$, the difference in utilities can be expressed as:

$$\begin{aligned}
\log u_{ij}^\theta\left(\boldsymbol{\tau}_j^L\right) - \log u_{ij}^\theta\left(\boldsymbol{\tau}_j^H\right) &= \nabla \log u_{ij}^\theta(\tilde{\boldsymbol{\tau}}) \cdot \left(\boldsymbol{\tau}_j^L - \boldsymbol{\tau}_j^H\right) \\
&= \frac{\partial \log u_{ij}^\theta(\tilde{\boldsymbol{\tau}})}{\partial \log \tau_j^L} \log \hat{\tau}_j^L - \frac{\partial \log u_{ij}^\theta(\tilde{\boldsymbol{\tau}})}{\partial \log \tau_j^H} \log \hat{\tau}_j^H
\end{aligned}$$

Using the chain rule, derivatives are:

$$\begin{aligned}
\frac{\partial \log u_{ij}^\theta(\tilde{\boldsymbol{\tau}})}{\partial \log \tau_j^{\hat{\theta}}} =& \frac{\partial \log a_j^\theta}{\partial \log L_j^L} \frac{\partial \log L_j^L}{\partial \log \tau_j^{\hat{\theta}}} + \frac{\partial \log a_j^\theta}{\partial \log L_j^H} \frac{\partial \log L_j^H}{\partial \log \tau_j^{\hat{\theta}}} \\
&+ \frac{\partial \log z_j^\theta}{\partial \log L_j^L} \frac{\partial \log L_j^L}{\partial \log \tau_j^{\hat{\theta}}} + \frac{\partial \log z_j^\theta}{\partial \log L_j^H} \frac{\partial \log L_j^H}{\partial \log \tau_j^{\hat{\theta}}} \\
=& \sum_{\theta'=L,H} \left(\gamma_{\theta',\theta}^{A,j} + \gamma_{\theta',\theta}^{P,j}\right) \varepsilon_{\hat{\theta},\theta'}^{\tau,j}
\end{aligned}$$

if $\hat{\theta} \neq \theta$, and is the same as above plus 1 if $\hat{\theta} = \theta$. Migration elasticities are:

$$\varepsilon_{\theta',\theta}^{\tau,j,t} = \partial \log L_{jt}^\theta / \partial \log \tau_{jt}^{\theta'}$$

$$\varepsilon^{\tau,j}_{L,L} = \frac{\partial \log L^L_j}{\partial \log \tau^L_j} = \left(\sigma_H - \gamma^{A,j}_{H,H} - \gamma^{P,j}_{H,H}\right)\psi^j \quad \varepsilon^{\tau,j}_{L,H} = \frac{\partial \log L^H_j}{\partial \log \tau^L_j} = \left(\gamma^{A,j}_{L,H} + \gamma^{P,j}_{L,H}\right)\psi^j$$
$$\varepsilon^{\tau,j}_{H,L} = \frac{\partial \log L^L_j}{\partial \log \tau^H_j} = \left(\gamma^{A,j}_{H,L} + \gamma^{P,j}_{H,L}\right)\psi^j \qquad \varepsilon^{\tau,j}_{H,H} = \frac{\partial \log L^H_j}{\partial \log \tau^H_j} = \left(\sigma_L - \gamma^{A,j}_{L,L} - \gamma^{P,j}_{L,L}\right)\psi^j \quad (17)$$

where $\psi_j = \left[\left(\sigma_L - \gamma^{A,j}_{L,L} - \gamma^{P,j}_{L,L}\right)\left(\sigma_H - \gamma^{A,j}_{H,H} - \gamma^{P,j}_{H,H}\right) - \left(\gamma^{A,j}_{L,H} + \gamma^{P,j}_{L,H}\right)\left(\gamma^{A,j}_{H,L} + \gamma^{P,j}_{H,L}\right)\right]^{-1}$.

If amenities and productivities are constant elasticity, one has that $\gamma^{x,j}_{\theta',\theta} = \gamma^{x}_{\theta',\theta}$ for all j, $x = A, P$, and θ, θ'. Which implies $\varepsilon^{\tau,j}_{\hat{\theta},\theta'} = \varepsilon^{\tau}_{\hat{\theta},\theta'}$ for all $j, \hat{\theta}, \theta$. The equation becomes:

$$g^\theta = \log \hat{\tau}^\theta_j + \sum_{\theta'=L,H}\left(\gamma^A_{\theta',\theta} + \gamma^P_{\theta',\theta}\right)\left(\varepsilon^\tau_{\theta,\theta'}\log \hat{\tau}^\theta_j - \varepsilon^\tau_{\neg\theta,\theta'}\log \hat{\tau}^{\neg\theta}_j\right)$$

Around a competitive equilibrium, this can be approximated as:

$$g^\theta(t_j) = g(0) + \left[\frac{\partial \log \hat{\tau}^\theta_j(0)}{\partial t_j} + \sum_{\theta'}\left(\gamma^A_{\theta',\theta} + \gamma^P_{\theta',\theta}\right)\left(\varepsilon^\tau_{\theta',\theta}\frac{\partial \log \hat{\tau}^\theta_j(0)}{\partial t_j} - \varepsilon^\tau_{\theta',\neg\theta}\frac{\partial \log \hat{\tau}^{\neg\theta}_j(0)}{\partial t_j}\right)\right]\cdot(t_j - 0)$$

The derivatives of corner subsidies with respect to the regional transfer are given by the budget constraints, which are, for each θ:

$$\left(\hat{\tau}^\theta_j - 1\right) z^\theta_j L^\theta_j = t_j$$

Differentiating with respect to t_j gives:

$$\frac{\partial \hat{\tau}^\theta_j}{\partial t_j} z^\theta_j L^\theta_j dt_j + \left(\hat{\tau}^\theta_j - 1\right)\left(\left(\frac{z^\theta_j}{L^\theta_j} + \frac{\partial z^\theta_j}{\partial L^\theta_j}\right)\frac{\partial L^\theta_j}{\partial \hat{\tau}^\theta_j} + \frac{\partial z^\theta_j}{\partial L^{\theta'}_j}\frac{\partial L^{\theta'}_j}{\partial \hat{\tau}^\theta_j}\right)\frac{\partial \hat{\tau}^\theta_j}{\partial t_j} L^\theta_j = dt_j$$

Evaluating this at $t_j = 0$ yields $\hat{\tau}^\theta_j = 1$, which implies:

$$\frac{\partial \hat{\tau}^\theta_j}{\partial t_j} z^\theta_j L^\theta_j = 1 \implies \frac{\partial \hat{\tau}^\theta_j}{\partial t_j} = \frac{\partial \log \hat{\tau}^\theta_j}{\partial t_j} = \frac{1}{\Upsilon^\theta_{j,0}}$$

which yields Equation (16) and Equation (8) in the main text.

A.2 Proof of Proposition 2

Voting Condition Use Proposition 1 and (17) for migration elasticities, one has:

$$\begin{aligned} g^L =& \log \hat{\tau}_j^L \left[1 + \gamma^A(\sigma - \gamma^A - \gamma^P)\psi + (\gamma^A + \gamma^P)\gamma^A\psi\right] \\ & - \log \hat{\tau}_j^H \left[\gamma^A(\gamma^A + \gamma^P)\psi + (\gamma^A + \gamma^P)(\sigma - \gamma^A)\psi\right] \\ =& \log \hat{\tau}_j^L \left(\frac{\sigma - \gamma^A - \gamma^P}{\sigma - 2\gamma^A - \gamma^P}\right) - \log \hat{\tau}_j^H \left(\frac{\gamma^A + \gamma^P}{\sigma - 2\gamma^A - \gamma^P}\right) \end{aligned}$$

Since $\sigma - 2\gamma^A - \gamma^P > 0$, one has:

$$g^L \propto \left(\sigma - \gamma^A - \gamma^P\right) \log \hat{\tau}_j^L - \left(\gamma^A + \gamma^P\right) \log \hat{\tau}_j^H$$

Effects When $g^L > 0$, one has that the transfer goes to the low skilled workers. Sizes in the new equilibrium (indexed by 1 in the subscript), are:

$$L_{j,1}^H = \frac{\left(\tau_{j,1}^L\right)^{\gamma^A\psi} \left(\iota_j^H\right)^{(\sigma-\gamma^A)\psi}}{\left(\tau_{s,1}^L\right)^{\gamma^A\psi} + \iota^{(\sigma-\gamma^A)\psi}} \qquad L_{j,1}^L = \frac{\left(\tau_{j,1}^L\right)^{(\sigma-\gamma^A-\gamma^P)\psi} \left(\iota_j^H\right)^{(\gamma^A+\gamma^P)\psi}}{\left(\tau_{s,1}^L\right)^{(\sigma-\gamma^A-\gamma^P)\psi} + \iota^{(\gamma^A+\gamma^P)\psi}}$$

So that:

$$L_{s,1}^L > L_{s,0}^L; \qquad L_{s,1}^H < L_{s,0}^H$$

Note that:

$$\frac{\partial y_{j1}}{\partial L_{j1}^H} = \frac{\gamma^P}{L_{j1}^H} y_{j1} + \frac{(\phi - 1)L_{j1}^L}{\left(L_{j1}^L + L_{j1}^H\right)^2} \left(L_{j1}^H\right)^{\gamma^P} > 0 \qquad \frac{\partial y_{j1}}{\partial L_{j1}^L} = -\frac{(\phi - 1)\left(L_{j1}^H\right)^{1+\gamma^P}}{\left(L_{j1}^L + L_{j1}^H\right)^2} < 0$$

Thus, $y_{s,1} < y_{s,0}$ and $y_{n,1} > y_{n,0}$. To decompose the effect, note that the elasticity of GDP per

capita with respect to a transfer is:

$$\frac{\partial y_j}{\partial t_s} = \left[-\frac{(\phi-1)\left(L_j^H\right)^{1+\gamma^P}}{\left(L_j^L+L_j^H\right)^2}\frac{\partial L_j^L}{\partial t_s} + \frac{(\phi-1)L_j^L\left(L_j^H\right)^{\gamma^P}+\gamma^P\left(L_j^H\right)^{\gamma^P-1}L_j^L\left(L_j^L+L_j^H\right)}{\left(L_j^L+L_j^H\right)^2}\frac{\partial L_j^H}{\partial t_s}\right]$$

$$\propto \underbrace{(\phi-1)(\delta_H-\delta_L)\frac{L_j^L\left(L_j^H\right)^{1+\gamma^P}}{\left(L_j^L+L_j^H\right)}}_{\text{Composition effect}} + \underbrace{\gamma^P\delta_H\left(L_j^H\right)^{\gamma^P}L_j^L}_{\text{Loss of spillovers}} < 0 \tag{18}$$

where $\delta_\theta = \frac{\partial L_j^\theta}{\partial t_s}\frac{t_s}{L_j^\theta}$ and, when $g<0$, $\delta_H<0$ and $\delta_L>0$. Wages are:

$$z_j^\theta = \phi^\theta\left(L_j^H\right)^{\gamma^P}$$

and are weakly increasing in the number of high skilled workers since $\gamma^P \geq 0$. Thus, $z_{s,1}^\theta < z_{s,0}^\theta$ for all $\theta = L, H$.

B Empirical Appendix

B.1 Specification for Figure 1

Figure 1 shows the residual binned scatter plots from regressions of the fraction of funds invested in innovation at the NUTS2 level on the fraction of low skilled individuals, coming from the following specification:

$$Y_j = \mathbf{R}_j\tau + \beta \mathrm{LS}_j + \varepsilon_j \tag{19}$$

where Y_j here indicates the fraction of funds invested in innovation in region j, over all funds invested in region j—and the remaining elements are as in specification (12). In particular, I control for country fixed effects, region objective fixed effects, and third-degree polynomials in the fraction of employment in different sectors, log GDP per capita, and log population. Standard errors, reported in the bottom-right corner are robust to heteroskedasticity. In Panel A, the sample for the regression is composed only of funds invested through programs where the local government was amongst the managing authorities. Panel B instead considers only funds invested through regional programs managed by centrally-appointed authorities.

B.2 Case Study on Italy

I show here additional evidence for Italy that ties the model and the empirics more closely by focusing on a different dependent variable: the probability that funds go to firms that are more likely to employ high-skilled workers.

In particular, I use data from the OpenCoesione project, a payment level database of all funds disbursed in Italy through the EU Cohesion Policy after 2007, which reports the beneficiary of each payment along with the 4-digit sector where it operates (if the beneficiary it is a firm). I focus again on the 2007-2013 tranche and study the probability that funds were invested in knowledge-intensive subsectors, defined by Eurostat as 2-digits sector that occupy a high share of college-educated workers.[32]

While the data is available at a granular level, focusing on Italy means that my main variable of interest—the fraction of low skilled workers in each region—varies only across 20 regions. Additionally, unfortunately, national managing authorities manage a non-trivial fraction of funds only in 5 regions—thus effectively allowing me to compare national and regional authorities only for a very small subset of regions.[33] This impedes a formal statistical analysis, but only showing the raw data is instructive. In particular, Figure B.1 reports the fraction of funds invested in knowledge intensive-sectors vs. the fraction of low skilled workers, separately for programs managed by local governments (in panel A) and those managed by the national governments (in panel B). Univariate regression estimates are reported at the bottom of the Figure, along with heteroskedasticity-robust standard errors. This shows that local governments invest less, on average, on knowledge-intensive sectors, compared to the national government, but especially so in regions with many low skilled workers.

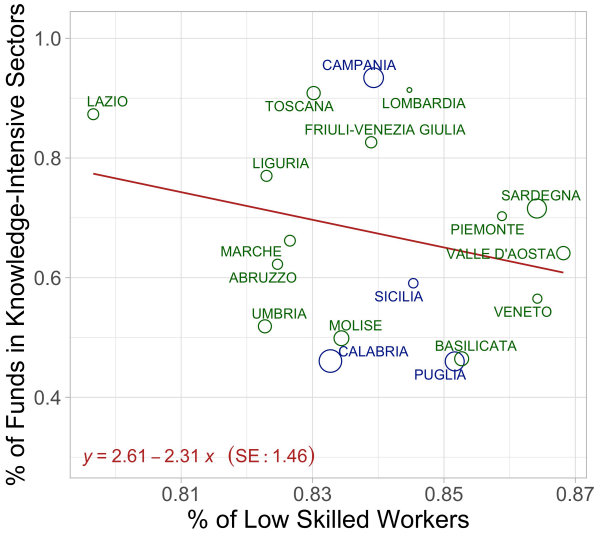
In addition to plotting the raw data, I can investigate patterns at the payment-level, under the caveat that my key variation occurs across very few data points. In particular, I run a specification identical to (12), up to four main differences. First, Y_{ij} is now a dummy indicating whether the investment is in a knowledge-intensive sector. Second, there are only two types of programs: national programs managed by the national government and regional ones managed by regional governments. Third, I cluster standard errors at the program level (42 operational programs), since there are only 20 regions. Finally, I can employ payment-level controls that are more granular,

[32] An activity is classified as knowledge intensive if tertiary educated persons employed are more than one third of the total employees in that activity. The definition is built based on the average number of employed persons aged 15-64 at aggregated EU-27 level in 2008 and 2009 according to the NACE Rev. 2 at 2-digit, using the EU Labour Force Survey data.

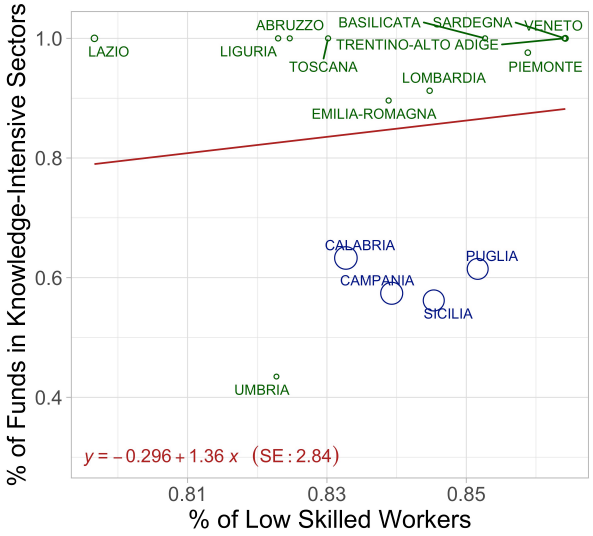
[33] These are Lazio, Campania, Puglia, Calabria, and Sicilia. There, the national government manages around 40% of the funds in the last four, and 11.6% in Lazio. For all other regions, the national government manages less than 4% of funds. An exception is Trentino-Alto Adige and Emilia Romagna, for which data on regionally managed funds is almost always missing and I mostly have data from nationally managed funds.

FIGURE B.1: REGIONAL INVESTMENT IN TECHNOLOGICAL DEVELOPMENT AND INNOVATION VS. FRACTION OF LOW SKILLED INDIVIDUALS, BY TYPE OF PROGRAM

(A) PROGRAMS MANAGED BY LOCAL GOVERNMENTS



(B) PROGRAMS MANAGED BY THE CENTRAL GOVERNMENT



Note: the figures report the fraction of funds invested in knowledge intensive sectors at the regional level (on the y-axes) against the fraction of low skilled individuals at the regional level (on the x-axes), across all Italian regions. Each circle represents a NUTS2 region and the size of the circle is proportional to the amount invested per capita at the NUTS2 level. Blue circles represent Objective 1 regions, while green circles all other regions. Standard errors, reported in parentheses, are robust to heteroskedasticity.

and I control for fixed effects on whether the payment was made towards the purchase of goods, purchase of services, subsidies to productive activities, subsidies to other types of individuals or firms, realization of public works, or equity infusions in firms.

Table B.1 reports the results of the analysis, which suggests that local governments seem to favor low-knowledge intensive firms in regions with many low skilled workers, while the national government does not. However, the nature of the data makes it hard to quantify uncertainty around the estimates, which are noisy except when employing regional and sectoral fixed effects.

TABLE B.1: INVESTED IN KNOWLEDGE INTENSIVE SECTORS AND FRACTION OF LOW SKILLED WORKERS, DATA FOR ITALY

	Dependent variable:						
	Investment in Knowledge Intensive Sector (Dummy)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Fraction Low Skilled	−0.975	1.082	7.379	4.050	0.642		
	(1.719)	(1.901)	(4.871)	(3.456)	(0.518)		
Managed by Local Government			5.649	2.510	−0.307	4.773	2.233***
			(4.562)	(3.084)	(0.477)	(4.136)	(0.728)
Low Skilled × Local Government			−6.868	−3.120	0.361	−5.636	−2.711***
			(5.397)	(3.675)	(0.567)	(4.924)	(0.883)
Regional Controls		✓	✓	✓	✓		
Project Type FE				✓	✓	✓	✓
1-Digit Sect. FE					✓		✓
Region FE						✓	✓
$\mathbb{E}(Y)$	0.84	0.84	0.84	0.84	0.84	0.84	0.84
$\mathbb{E}$(frac. Low Skill)	0.4	0.4	0.4	0.4	0.4	0.4	0.4
# of Clusters (Programs)	42	42	42	42	42	42	42
Observations	20,089	20,089	20,089	20,089	20,089	20,085	20,085
R^2	0.001	0.086	0.099	0.197	0.857	0.210	0.852

Note: the table reports results from a WLS regression of a dummy indicating whether a payment i to region j was targeted towards knowledge-intensive subsectors, allowing for heterogeneous effects across types of authorities managing the funds, and controlling for various covariates at the payment level and at the region level. Regional controls are constructed and included following the discussion in Section 4.1. Project type fixed effects are defined in Section B.2. Each observation is weighted by the ratio between the amount invested in region j through payment i over the total amount invested in region j. Parentheses report clustered standard errors at the operational program level.

B.3 Extra Tables

TABLE B.2: SUMMARY OF DATA AVAILABILITY

Data	Amount (€B)	% of above	% of total
ERDF, ESF, and CF available in expenditure categorization data	368	–	–
– of which, at the regional level	283	76.9%	76.9%
– of which, excluding Cross-Border Cooperation programs and single-region states	265	94%	72.0%
– of which, with data available on jobs created	170	64.2%	46.2%
– of which, with data available on jobs created imputable to one region	86.7	51%	23.6%

TABLE B.3: INVESTMENT IN INNOVATION AND JOBS CREATED AT THE PROGRAM LEVEL, ONLY PROGRAMS CONCENTRATED IN ONE REGION

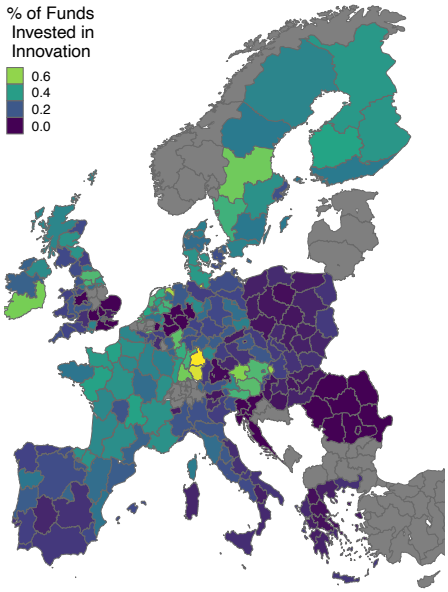
	Dependent variable:					
	log(jobs created per €1mil.)					
	(1)	(2)	(3)	(4)	(5)	(6)
% invested in Tech. Dev. and Innov.	1.846**	0.393	−0.625	2.546***	0.147	−1.249
	(0.866)	(0.951)	(1.232)	(0.618)	(0.609)	(1.503)
... × Objective 2 fund			1.974			1.704
			(1.647)			(1.697)
Obj. 2 fund		0.116	−0.248		0.373	0.108
		(0.364)	(0.487)		(0.281)	(0.423)
Constant	1.201***	2.863***	2.840***	1.307***	2.759***	2.921***
	(0.193)	(0.422)	(0.424)	(0.172)	(0.285)	(0.355)
Country FE		✓	✓		✓	✓
Weighted by tot. € invested in CCI	✓	✓	✓			
$\mathbb{E}(Y)$	1.937	1.937	1.937	1.937	1.937	1.937
$\mathbb{E}$(% inv. in TD&I)	0.248	0.248	0.248	0.248	0.248	0.248
Observations	139	139	139	139	139	139
R^2	0.074	0.423	0.432	0.126	0.632	0.636

Note: the table reports results from WLS and OLS regressions of log(jobs created per €) by a given investment program on the fraction of funds invested in innovation within that program, controlling for country fixed effects and allowing for heterogeneous effects across the objectives pursued by each fund (whether the fund was Objective 1, 2, or multiple). In Columns (1) to (3), each observation is weighted by the total amount invested in each program. Columns (4) to (6) weight each program equally. Parentheses report heteroskedasticity-robust standard errors. The sample is restricted to funds that can be uniquely apportioned to one region and can be used in specification (13).

B.4 Extra Figures

FIGURE B.2: INVESTMENT IN TECH. DEV. & INNOV. AND % OF LOW SKILLED WORKERS

(A) FRACTION OF FUNDS INVESTED IN TD&I OVER ALL FUNDS RECEIVED



(B) FRACTION OF RESIDENTS AGED 25-64 WITHOUT TERTIARY EDUCATION

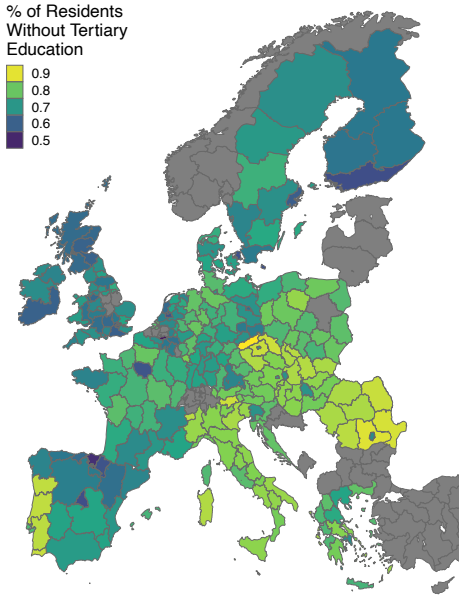
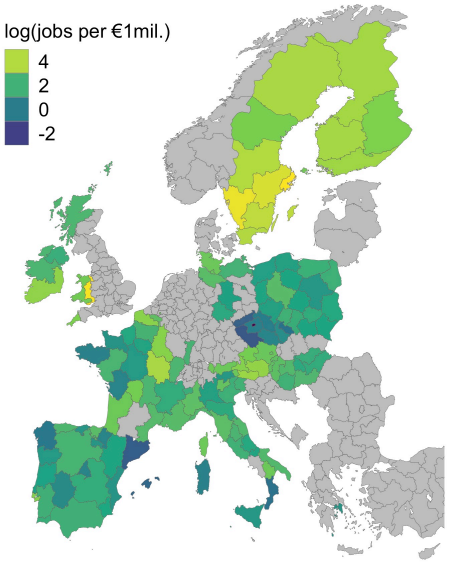


FIGURE B.3: JOBS CREATED PER €MILLION INVESTED

(A) MAP, FOR PROGRAMS THAT CAN BE FULLY APPORTIONED TO ONE REGION



(B) DENSITY PLOT, ALL PROGRAMS

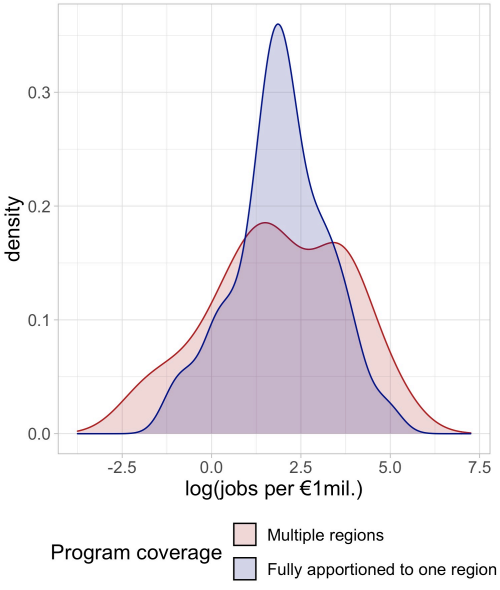
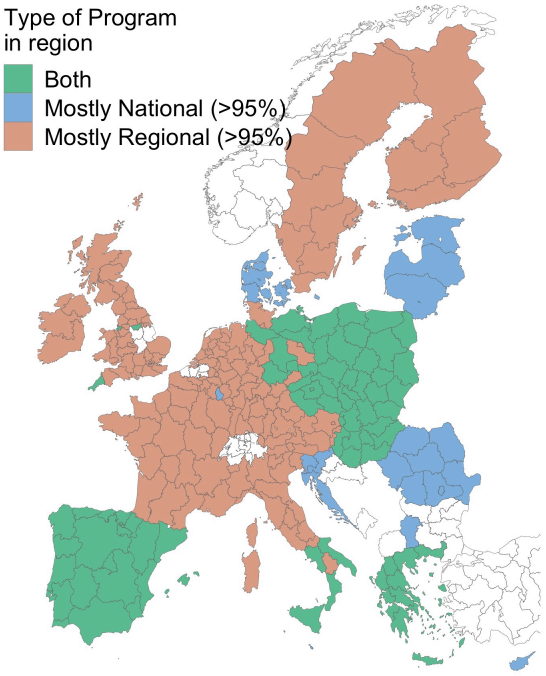


FIGURE B.4: PROGRAM TYPES AND MANAGING AUTHORITIES

(A) TYPES OF PROGRAMS



(B) TYPES OF REGIONAL MANAGING AUTHORITIES

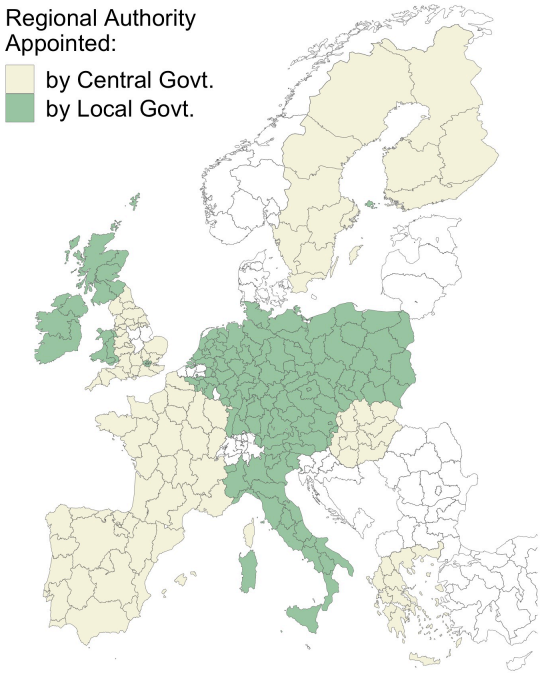
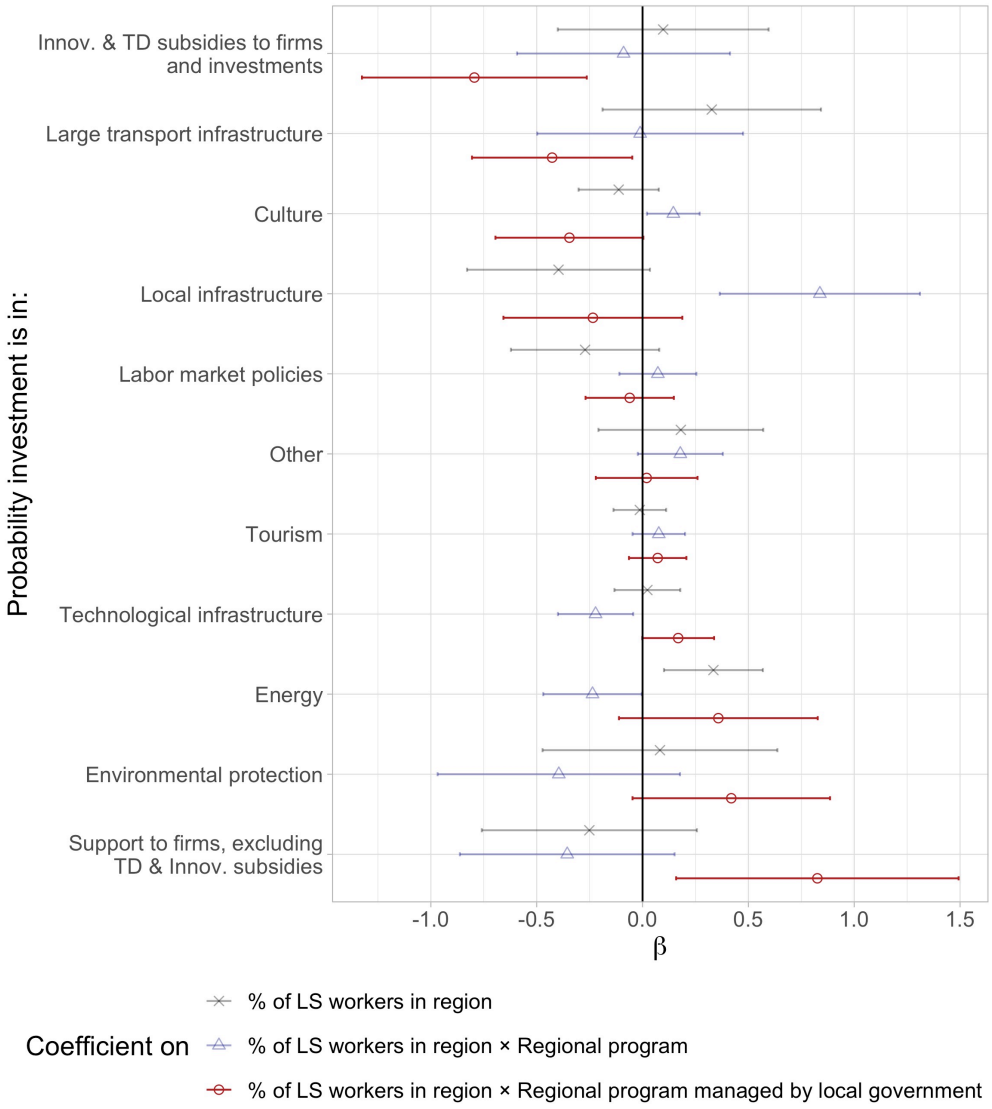


FIGURE B.5: REGRESSION COEFFICIENTS OF PROBABILITY OF INVESTING IN y VS. THE FRACTION OF LOW SKILLED WORKERS, BY MANAGING AUTHORITY



Note: the figure reports the β_m (on the $x-$axis) from regression (12) for different regressions using different investment categories as dependent variables (on the $y-$axis). That is, for each category on the $y-$axis, it reports the coefficient of the probability that fund i in region j is invested in category y on the fraction of low skilled workers in region j, interacted with the type of program and managing authority of each fund i. The uninteracted coefficients are in gray, the interacted coefficients with a dummy for whether the fund comes from a regional operational program are in blue, while the interactions with a dummy for whether the fund comes from a regional operational program that is managed by local governments are in red. The specification is the one employed in Column (5) of Table 1, which controls for country fixed effects, payment controls as defined in Section 4 and third-degree polynomials in regional characteristics as defined in the same Section. Each observation is weighted by the ratio between the amount invested in region j through payment i over the total amount invested in region j. Horizontal bars report 95% confidence intervals, with clustered standard errors at the NUTS2 level.

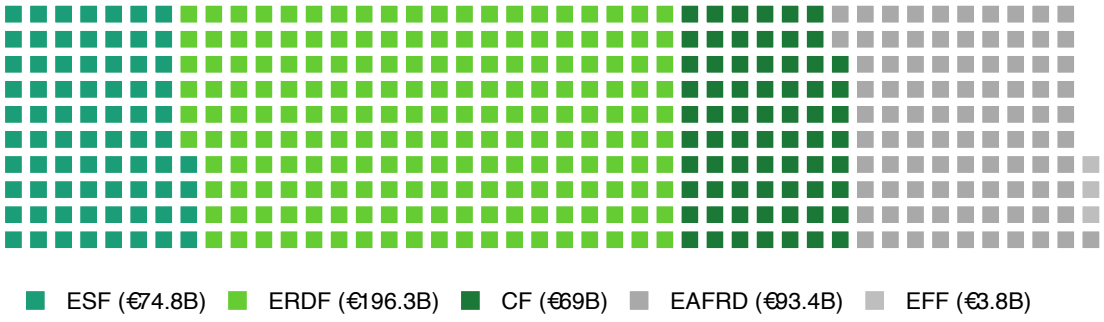
Online Appendix for "Place Based Policies with Local Voting. Lessons From the EU Cohesion Policy"

Leonardo D'Amico

January, 2023

Figures

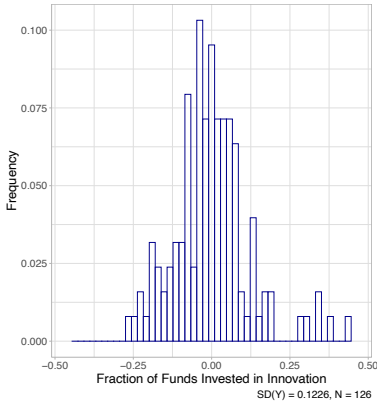
FIGURE O.A.1: AMOUNT INVESTED IN THE EU REGIONAL POLICY BETWEEN 2007 AND 2014, BY FUND



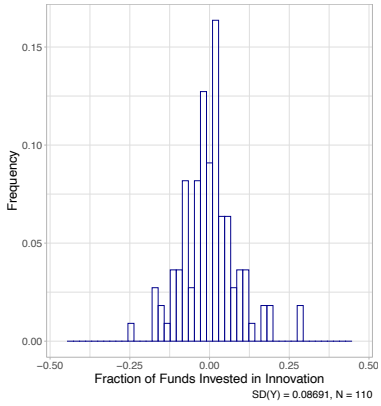
Note: Each box represents €1B invested. Funds in green are those available in the dataset .

FIGURE O.A.2: DISTRIBUTION OF THE FRACTION OF FUNDS INVESTED BY TYPE OF MANAGING AUTHORITY (MA)

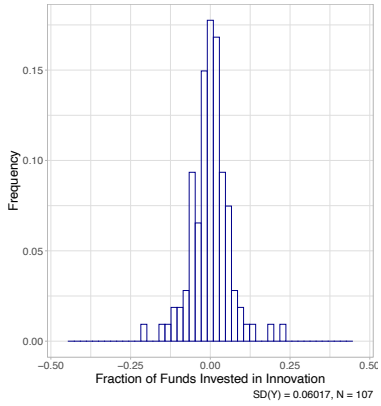
(A) REGIONAL PROG. MANAGED BY THE LOCAL GOVERNMENT, RESIDUALIZED



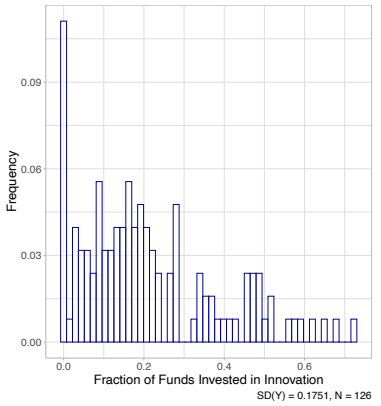
(B) REGIONAL PROG. MANAGED BY CENTRALLY APPOINTED AUTHORITY, RESIDUALIZED



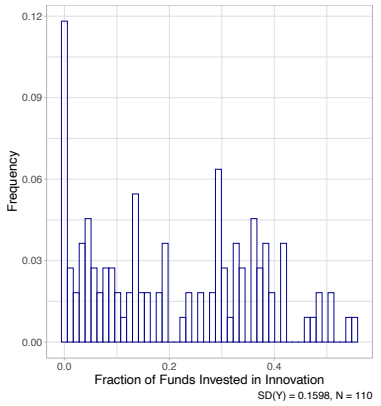
(C) NATIONAL PROG., RESIDUALIZED



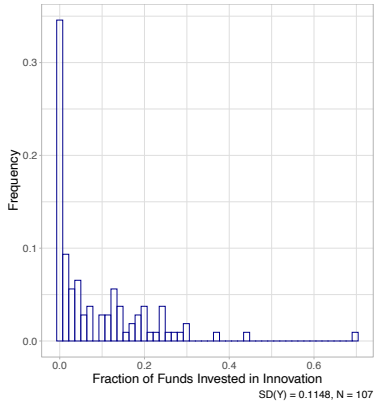
(D) REGIONAL PROG. MANAGED BY THE LOCAL GOVERNMENT, RAW



(E) REGIONAL PROG. MANAGED BY CENTRALLY APPOINTED AUTHORITY, RAW



(F) NATIONAL PROG., RAW



Note: the figures report the distribution, across regions, of the fraction of funds invested in innovation. Panels A, B, and C report the residualized fraction on Country FE and 5-degree polynomials in sectorial composition, log GDP per capita, and log population, as detailed in equation (19). Panels D, E and F report the raw fractions. The sample in the left panels (A and D) is composed only by funds invested through regional programs managed by the local government, while the central panels (B and E) consider funds invested through regional programs managed by centrally appointed authorities. The right panels (C and F) consider national programs managed by national authorities. The respective standard deviations are annotated below each Panel.

Tables

TABLE O.A.1: OPERATIONAL PROGRAMS, BY COUNTRY AND TYPE

Country	Type	# of programs	Investment (Million €)	Country	Type	# of programs	Investment (Million €)
Austria	Regional Programs	10	690	Italy	National Programs	8	5851
	– man. by local govt.	10	690		Regional Programs	42	22681
Belgium	Regional Programs	6	944		– man. by local govt.	42	22681
	– man. by local govt.	6	944	Latvia	National Programs	3	4864
Bulgaria	National Programs	1	449	Lithuania	National Programs	4	6680
Croatia	National Programs	1	244	Luxembourg	National Programs	2	63
Cyprus	National Programs	2	612	Malta	National Programs	2	855
Czech Republic	National Programs	8	25780	Netherlands	Regional Programs	4	801
	Regional Programs	9	4869		– man. by local govt.	4	801
	– man. by local govt.	9	4869	Poland	National Programs	2	30618
Denmark	National Programs	2	442		Regional Programs	16	16592
Estonia	National Programs	3	3393		– man. by local govt.	16	16592
Finland	Regional Programs	6	1017	Portugal	National Programs	3	12828
	– man. by local govt.	2	7		Regional Programs	9	7357
France	Regional Programs	30	8540		– man. by local govt.	4	1618
	– man. by local govt.	1	74	Romania	National Programs	2	10268
Germany	National Programs	1	1511	Slovakia	National Programs	7	4452
	Regional Programs	27	17341		Regional Programs	2	1474
	– man. by local govt.	27	17341	Slovenia	National Programs	1	1426
Greece	National Programs	9	13862	Spain	National Programs	7	13323
	Regional Programs	5	8652		Regional Programs	38	23426
Hungary	National Programs	7	16179	Sweden	Regional Programs	8	883
	Regional Programs	7	5410	U.K.	National Programs	1	663
Ireland	Regional Programs	2	385		Regional Programs	19	6328
	– man. by local govt.	2	385		– man. by local govt.	11	3825

TABLE O.A.2: EXPENDITURE BY PRIORITY CODE

Priority Code	Categorization	EU Investment (Million €)	% of tot.
R&TD activities in research centres	TD&I subsidies to firms and TD&I investments	5918.42	1.64
R&TD infrastructure and centres of competence in a specific technology	TD&I subsidies to firms and TD&I investments	11142.78	3.09
Technology transfer and improvement of cooperation networks ...	TD&I subsidies to firms and TD&I investments	3739.33	1.04
Assistance to R&TD, particularly in SMEs (including access to R&TD services in research centres)	TD&I subsidies to firms and TD&I investments	5965.96	1.66
Advanced support services for firms and groups of firms	Support to firms, excluding TD&I subsidies	4820.88	1.34
Assistance to SMEs for the promotion of environmentally-friendly products and production processes (...)	Support to firms, excluding TD&I subsidies	2000.81	0.56
Investment in firms directly linked to research and innovation (...)	TD&I subsidies to firms and TD&I investments	9851.82	2.74
Other investment in firms	Support to firms, excluding TD&I subsidies	17857.97	4.96
Other measures to stimulate research and innovation and entrepreneurship in SMEs	TD&I subsidies to firms and TD&I investments	7691.17	2.14
Telephone infrastructures (including broadband networks)	Technological infrastructure	2080.48	0.58
Information and communication technologies (...)	Technological infrastructure	3029.03	0.84
Information and communication technologies (TEN-ICT)	Technological infrastructure	269.22	0.07
Services and applications for citizens (e-health, e-government, e-learning, e-inclusion, etc.)	Technological infrastructure	5692.43	1.58
Services and applications for SMEs (e-commerce, education and training, networking, etc.)	Support to firms, excluding TD&I subsidies	1644.24	0.46
Other measures for improving access to and efficient use of ICT by SMEs	Support to firms, excluding TD&I subsidies	1225.07	0.34
Railways	Large transport infrastruct.	5119.44	1.42
Railways (TEN-T)	Large transport infrastruct.	16313.10	4.53
Mobile rail assets	Large transport infrastruct.	1227.49	0.34
Mobile rail assets (TEN-T)	Large transport infrastruct.	440.90	0.12
Motorways	Large transport infrastruct.	4593.82	1.28
Motorways (TEN-T)	Large transport infrastruct.	21283.13	5.91
National roads	Large transport infrastruct.	7557.55	2.10
Regional/local roads	Local infrastructure	12701.38	3.53

Cycle tracks	Local infrastructure	470.76	0.13
Urban transport	Local infrastructure	2395.40	0.67
Multimodal transport	Large transport infrastruct.	1820.70	0.51
Multimodal transport (TEN-T)	Large transport infrastruct.	184.93	0.05
Intelligent transport systems	Large transport infrastruct.	548.39	0.15
Airports	Large transport infrastruct.	1658.17	0.46
Ports	Large transport infrastruct.	3143.19	0.87
Inland waterways (regional and local)	Large transport infrastruct.	147.78	0.04
Inland waterways (TEN-T)	Large transport infrastruct.	226.37	0.06
Electricity	Energy	187.99	0.05
Electricity (TEN-E)	Energy	257.84	0.07
Natural gas	Energy	458.71	0.13
Natural gas (TEN-E)	Energy	384.20	0.11
Petroleum products	Energy	0.18	0.00
Renewable energy: wind	Energy	624.67	0.17
Renewable energy: solar	Energy	1007.51	0.28
Renewable energy: biomass	Energy	812.46	0.23
Renewable energy: hydroelectric, geothermal and other	Energy	510.45	0.14
Energy efficiency, co-generation, energy management	Energy	7116.74	1.98
Management of household and industrial waste	Environmental protection	5293.83	1.47
Management and distribution of water (drink water)	Environmental protection	7016.46	1.95
Water treatment (waste water)	Environmental protection	17268.15	4.79
Air quality	Environmental protection	1419.07	0.39
Integrated prevention and pollution control	Environmental protection	239.31	0.07
Mitigation and adaption to climate change	Environmental protection	141.05	0.04
Rehabilitation of industrial sites and contaminated land	Environmental protection	2108.23	0.59
Promotion of biodiversity and nature protection (including Natura 2000)	Environmental protection	2362.92	0.66
Promotion of clean urban transport	Environmental protection	6129.06	1.70
Risk prevention (...)	Environmental protection	6415.12	1.78
Other measures to preserve the environment and prevent risks	Environmental protection	1247.51	0.35
Promotion of natural assets	Tourism	765.04	0.21
Protection and development of natural heritage	Tourism	607.51	0.17
Other assistance to improve tourist services	Tourism	4386.70	1.22
Protection and preservation of the cultural heritage	Culture	3795.72	1.05
Development of cultural infrastructure	Culture	2095.73	0.58
Other assistance to improve cultural services	Culture	228.51	0.06
Integrated projects for urban and rural regeneration	Local infrastructure	10249.07	2.85
Development of life-long learning systems and strategies in firms; training and services for employees ...	Support to firms, excluding TD&I subsidies	7941.46	2.21

Design and dissemination of innovative and more productive ways of organising work	Labor market policies	1088.81	0.30
Development of special services for employment, training and support in connection with restructuring of sectors ...	Labor market policies	2358.80	0.65
Modernisation and strengthening labour market institutions	Labor market policies	1577.42	0.44
Implementing active and preventive measures on the labour market	Labor market policies	19064.21	5.29
Measures encouraging active ageing and prolonging working lives	Labor market policies	480.42	0.13
Support for self-employment and business start-up	Support to firms, excluding TD&I subsidies	2772.76	0.77
Measures to improve access to employment and increase sustainable participation and progress of women ...	Labor market policies	3145.32	0.87
Specific action to increase migrants' participation in employment ...	Labor market policies	762.23	0.21
Pathways to integration and re-entry into employment for disadvantaged people ...	Labor market policies	11729.96	3.26
Design, introduction and implementing of reforms in education and training systems ...	Labor market policies	9457.09	2.63
Measures to increase participation in education and training throughut the life-cycle ...	Labor market policies	14329.86	3.98
Developing human potential in the field of research and innovation, in particular through post-graduate studies ...	Labor market policies	4046.01	1.12
Education infrastructure	Local infrastructure	9825.33	2.73
Health infrastructure	Local infrastructure	5783.47	1.61
Childcare infrastructure	Local infrastructure	612.21	0.17
Housing infrastructure	Local infrastructure	629.74	0.17
Other social infrastructure	Local infrastructure	2814.16	0.78
Promoting the partnerships, pacts and initiatives through the networking of relevant stakeholders	Other	648.48	0.18
Mechanisms for improving good policy and programme design, monitoring and evaluation ...	Other	3823.04	1.06
Compensation of any additional costs due to accessibility deficit and territorial fragmentation	Other	535.30	0.15
Specific action addressed to compensate additional costs due to size market factors	Other	45.89	0.01
Support to compensate additional costs due to climate conditions and relief difficulties	Other	37.35	0.01

Preparation, implementation, monitoring and inspection	Other	8898.73	2.47
Evaluation and studies; information and communication	Other	1837.48	0.51

TABLE O.A.3: EXPENDITURE BY TARGETED SECTOR

Targeted Sector	EU Investment (Million €)	% of tot.
Agriculture, hunting and forestry	767.83	0.21
Fishing	148.71	0.04
Manufacture of food products and beverages	1653.04	0.46
Manufacture of textiles and textile products	564.20	0.16
Manufacture of transport equipment	1515.69	0.42
Unspecified manufacturing industries	17612.76	4.89
Mining and quarrying of energy producing materials	78.00	0.02
Electricity, gas, steam and hot water supply	4472.33	1.24
Collection, purification and distribution of water	13015.56	3.61
Post and telecommunications	2171.71	0.60
Transport	73364.25	20.37
Construction	15725.43	4.37
Wholesale and retail trade	2053.03	0.57
Hotels and restaurants	3151.50	0.88
Financial intermediation	5581.38	1.55
Real estate, renting and business activities	6786.51	1.88
Public administration	36304.67	10.08
Education	31065.41	8.63
Human health activities	8301.55	2.31
Social work, community, social and personal services	8634.17	2.40
Activities linked to the environment	27504.10	7.64
Other unspecified services	34131.77	9.48
Not applicable	65533.80	18.20