Place-Based Policies: Lessons from Theory (Preliminary)*

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Abstract

We revisit the rationale for place-based policies through the lens of a general urban framework that incorporates density spillovers. We draw six main lessons from theory. First, the spatial allocation is inefficient even when spillover elasticities are constant across regions. Therefore, agglomeration non-linearities are not necessary to justify policy intervention. Second, with constant spillover elasticities, targeting regions is not necessary: a national wage subsidy combined with a lump sum tax to finance it is optimal. Third, beyond the constant-elasticity case, the optimal labor subsidy for a region equals its spillover elasticity. Fourth, place-based policies that favor low-wage locations on efficiency grounds are justified under either negative effects from density, higher spillover elasticities in low-wage locations, or across-skill spillovers that favor more mixing in low-wage areas. Fifth, government spending on infrastructure, investment incentives, or housing policies cannot optimally address externalities from labor density. Sixth, housing supply elasticities do not influence the optimal place-based policies.

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1 Introduction

Regional economic disparities are the norm rather than the exception, driven by factors like geographic specialization, historical development patterns, and structural shifts such as the rise of the knowledge economy, the decline of manufacturing and the development of international trade. Governments often view regional inequalities in income and employment as a concern. In lagging regions the worry is the lack of economic opportunities and weakened public services, while in thriving areas issues like overcrowding or high housing costs become prominent challenges.

Addressing these imbalances has become an important part of policymaking. To tackle regional disparities, governments often implement *place-based policies.* Widely varying in form, these policies have in common that they target specific locations rather people. Place-based policies are receiving renewed attention in policy circles, but they also have a long history of being implemented worldwide.

When do place-based policies enhance welfare? Broadly speaking, there are two reasons. First, they can be justified on efficiency grounds if they address market failures, such as underinvestment in local public goods or missed productivity gains from agglomeration effects. Second, they may be warranted on equity grounds, serving as tools to reduce regional inequality even where market failures are not present. In both cases, however, resources directed to workers or investment in a targeted region must be diverted from somewhere else in country or from other local uses. These shadow costs may offset social benefits.

When are place-based policies justified? We answer this question by grounding the analysis in a canonical economic model. We draw a number of general lessons from standard theory. The main focus of the discussion focuses is the efficiency reason for place-based policies. We also discuss some key considerations in the case of equity-driven policies. The rest of the paper is structured as follows. Section 2 examines place-based policies that aim to restore efficiency within a canonical urban model. Section 3 explores conditions under which place-based policies may be optimally targeted at lower-wage regions. Section 4 distills six key lessons from this analysis, and section 5 concludes.

2 Place-Based Policies for Efficiency in a Canonical Urban Model

Place-based policies designed to promote local development broadly fall into two main categories: investment subsidies and employment subsidies. Investment subsidies may include tax breaks, grants, or public infrastructure funding to develop capital. A well-known example is the Tennessee Valley Authority, a federally-funded New-Deal era policy aimed at modernizing infrastructure in the southeastern U.S. (Kline and Moretti, 2014a). Employment subsidies are often implemented via hiring subsidies incentivizing firms to hire in distressed areas (Slattery and Zidar, 2020). A prominent example in the U.S. is the Empowerment Zones program (Busso et al., 2013), offering tax credits to businesses that hire within designated zones, with similar enterprise zone programs across the E.U. for instance (Ehrlich and Overman, 2020). More broadly, all taxes and

subsidies that vary across space may in practice act like place-based policies by fostering local activity. Examples include federal income taxes (Albouy, 2009; Colas and Hutchinson, 2021), state taxes (Fajgelbaum et al., 2018), and place-specific components of welfare benefits.

We study investment and employment subsidies in a canonical urban model with spillovers from agglomeration. In the model, the concentration of labor or infrastructure generates externalities. Therefore, capital and labor are not optimally allocated spatially by market forces. We use the model to identify policies that enhance welfare around an observed allocation as well as policies that implement the optimal allocation.

Consider an economy where production takes place in J cities or regions. In each region, competitive firms produce final output using labor L_j and infrastructure I_j. This output is freely traded between regions. In region j, the firms' production function is $Y_j = A_j F_j \left(z_j L_j, I_j\right)$. Labor productivity in region j is z_j, while TFP is A_j. Infrastructure I_j is produced locally by competitive construction firms using the traded good as an input. These firms charge a price p_j equal to the marginal cost of infrastructure.

Market failures arise from two channels. First, the productivity of workers z_j can be subject to an agglomeration spillover whereby labor productivity increases with the density of local employment, i.e., $z_j'\left(L_j\right) > 0$. This dependence of labor productivity on density is a central force in urban economics. It is one of the main reasons why cities exist (Henderson, 1974). An extensive body of research estimates the extent of such agglomeration effects (see Combes and Gobillon (2015) for a review). This spillover is not taken into account by firms when making their hiring decision. Second, TFP may depend on the level of local infrastructure, i.e. $A_j'\left(I_j\right) > 0$. Infrastructure investments (like transport, water, or energy) have efficiency impacts that exceed their returns to private suppliers. Large sunk costs in infrastructure also imply increasing returns, which are present in this framework. Increasing returns and under-provision of infrastructure is a standard motivation for public provision or regulation of private utilities.

In the model, these two spillovers are conveniently summarized by the following "spillover elasticities":

$$\gamma_j^L\left(L_j\right) \equiv \frac{\partial z_j / \partial L_j}{z_j / L_j} \text{ and } \gamma_j^I\left(I_j\right) \equiv \frac{\partial A_j / \partial I_j}{A_j / I_j}\left(\frac{\partial F_j / \partial I_j}{F_j / I_j}\right)^{-1}. \tag{1}$$

The first elasticity is that of labor productivity with respect to labor in region j, while the second one is that of TFP with respect to infrastructure in region j, normalized by the elasticity of output to infrastructure. This normalization accounts for the fact that private suppliers do internalize part of the benefit of infrastructure when they invest. In principle, these elasticities can be variable both across locations and as a function of local scale. We discuss below a special case that plays an important role in the literature, in which spillovers elasticities are uniform across regions.

Workers in j derive utility $u_j\left(c_j, h_j\right)$ from consumption of the traded good c_j and housing h_j. For simplicity of exposition housing is assumed to be in fixed supply in each location, but this plays no role in any of the results. The utility function is indexed by location j to allow for the possibility that worker's utility depends on amenities that are specific to their place of residence.

Labor is mobile across regions, so that workers' utility is equalized across regions. Workers' income includes labor income w_j as well as unearned income π, their claim to aggregate firms' profits.[1] Labor income w_j is the workers' private marginal product of labor, which takes productivity as given.[2]

A federal government can use two policies:

$$\text{Investment subsidy in } j : s_j^I,$$
$$\text{Hiring subsidy in } j : s_j^L.$$

The infrastructure investment subsidies s_j^I are such that the price of infrastructure for firms in j is $p_j - s_j^I$, and the hiring subsidies s_j^L are such that their labor costs are $w_j - s_j^I$.[3] We assume that a lump-sum tax paid by all workers finances these subsidies. The federal budget is balanced, so that:

$$\sum_j s_j^I I_j + \sum_j s_j^L L_j = tL.$$

2.1 Welfare-Enhancing Reallocations

Consider a market allocation where some government subsidies are already in place. To determine whether these subsidies are well targeted, we ask if there are reallocations of labor or infrastructure investments that can raise welfare. If that is the case, changes to existing subsidies incentivizing these reallocations would be desirable.

Concretely, suppose that ΔL_j additional workers and ΔI_j additional infrastructure was allocated to j. In this thought experiment, aggregate constraints have to hold –in particular, total population is fixed, so other locations have to see a decrease. To a first order approximation, the impact on welfare of these reallocations is as follows:

$$\text{Welfare Gain from Reallocations} = \sum_j \left(\Gamma_j^L - s_j^L\right) \Delta L_j + \sum_j \left(\Gamma_j^I - s_j^I\right) \Delta I_j, \tag{2}$$

where

$$\Gamma_j^L \equiv \gamma_j^L \left(w_j - s_j^L\right) \text{ and } \Gamma_j^I \equiv \gamma_j^I \left(p_j - s_j^I\right). \tag{3}$$

The term Γ_j^L in (3) measures the productivity spillovers created by adding a worker to location j. It equals the spillover elasticity multiplied by the (private) marginal product of labor, in turn equal to the marginal hiring cost for firms.[4] Similarly, Γ_j^I measures the spillovers generated by additional

[1] We assume that workers own both labor and land in this economy, eliminating issues related to the incidence of policies, as our focus is on the efficiency of the equilibrium. The distributional implications of place-based policies are addressed in Section 4.

[2] I.e., $w_j = \frac{\partial Y_j}{\partial L_j} = A_j \frac{\partial F_j\left(z_j L_j, I_j\right)}{\partial\left(z_j L_j\right)} z_j$.

[3] We assume throughout that spatial distortions to the supply of infrastructure are tackled by infrastructure subsidies for local firms. Spatial efficiency can also be also achieved by subsidizing the supply of infrastructure. For example, suppliers may price below marginal cost and be compensated in a lump-sum fashion for their losses.

[4] Had we defined s_j^L as a personal income subsidy received by residents of j rather than as a hiring subsidy, then equation (2) would have looked identical but with $\Gamma_j^L \equiv \gamma_j^L w_j$, as in this case the (private) marginal product of labor would have been the wage paid by firms.

infrastructure, again equal to the spillover elasticity multiplied by the (private) marginal product of infrastructure, in turn equal to the marginal building cost.

With these definitions at hand, expression (2) is intuitive. The term $\Gamma_j^L - s_j^L$ is the net effect on welfare of adding a worker to location j. Adding a worker to j generates positive spillovers, represented by Γ_j^L, but incurs a cost to the government, s_j^L, in subsidies. Similarly, $\Gamma_j^I - s_j^I$ is the net welfare effect of marginally increasing infrastructure in location j. This investment raises TFP for all firms (measured by Γ_j^I) but comes at a cost s_j^I to the government.

The formula highlights two sufficient statistics for inferring which reallocations would improve welfare, and for testing whether an observed allocation is efficient. First, consider labor reallocations, specifically a reallocation of a small number of workers from location i to location j ($\Delta L_i = -\Delta L_j$). A policy that induces this reallocation, while keeping the number workers and the level of infrastructure constant in all other locations, is desirable whenever

$$\Gamma_j^L - s_j^L > \Gamma_i^L - s_i^L. \tag{4}$$

Expression (4) indicates the direction of desirable labor reallocations based on terms that can, in principle, be estimated and measured in an observed equilibrium. In particular, from the definition of Γ_j^L, it follows that in a *laissez-faire* equilibrium without pre-existing subsidies, reallocations to locations with higher wages and higher spillover elasticities increase welfare relative to the status quo (assuming agglomeration effects are positive). By contrast, the reallocations driven by place-based policies that are actually implemented typically tend to favor lower-wage locations. In cases with more general spillovers, such as congestion (discussed later in the article), a rationale for reallocating to poorer locations arises. Condition (4) also has a quantitative interpretation, as it ranks location by where an additional worker would provide the most value.

A second sufficient statistic relates to the allocation of infrastructure investment. A policy that marginally increases infrastructure in location j while keeping infrastructure everywhere else constant and financing this increase by reducing final consumption, is welfare-enhancing whenever:

$$\Gamma_j^I - s_j^I > 0. \tag{5}$$

In a *laissez-faire* equilibrium, it is efficient to increase infrastructure when either its spillover elasticity or its marginal cost is high.Although the inclusion of marginal cost in this expression may seem counterintuitive, the logic parallels that for labor: the private marginal cost equals the private marginal product, serving as the basis for calculating the spillover value of reallocations. The left-hand side of condition (5) also provides a ranking of locations where marginal infrastructure increases would be most valuable.

2.2 Optimal Policies

The discussion so far has addressed the question: around an observed allocation, considering small changes, which places should expand in employment or infrastructure? We now turn to a different question: what is the the optimal distribution of subsidies? These optimal subsidies could differ significantly from the observed equilibrium, potentially leading to large reallocations. In that

case, the first-order approach applied so far, while useful for understanding the optimal direction of small reallocations, might poorly approximate the optimal direction and magnitude of large reallocations. For example, a location could offer the highest returns to an additional dollar of subsidies but might not receive the largest subsidies at the global optimum.

Expressions (4) and (5) can be used to find the optimal subsidies. At an optimal allocation, it should not be possible to find any welfare-improving reallocations of labor or infrastructure.According to (4), this requires that $\Gamma_j^L - s_j^L$ be equalized across locations. Likewise, (5) implies that $\Gamma_j^I - s_j^I = 0$ in all locations. Thus, the optimal allocation can be implemented with hiring subsidies s_j^{L*} and infrastructure subsidies s_j^{I*} such that:

$$s_j^{L*} = \Gamma_j^{L*} = \frac{\gamma_j^{L*}}{1+\gamma_j^{L*}} w_j^*, \qquad \forall j \tag{6}$$

$$s_j^{I*} = \Gamma_j^{I*} \equiv \frac{\gamma_j^{I*}}{1+\gamma_j^{I*}} p_j^*, \qquad \forall j \tag{7}$$

combined with a tax lump sum tax t^* paid by all firms to ensure government budget balance:

$$t^* = \frac{1}{L} \sum_j \frac{\gamma_j^{L*}}{1+\gamma_j^{L*}} w_j^* L_j^* + \frac{1}{L} \sum_j \sum_j \frac{\gamma_j^{I*}}{1+\gamma_j^{I*}} p_j^* I_j^*. \tag{8}$$

In all these expressions, an asterisk denotes that the variable is evaluated at the optimal allocation. Recall that the spillover elasticities may vary with the labor and infrastructure allocations.

Equations (6)-(7) show that the dollar value of optimal subsidies equals the value of the spillovers.[5] Hence, spatial policies are not special: similar to any policy addressing externalities, place-based policies correct urban spillovers through an intuitive Pigouvian subsidy. Another intuitive takeaway is that the optimal way to address spillovers from labor density is with labor subsidies. It is not optimal to tackle labor-driven agglomeration externalities by incentivizing capital accumulation in the region. Infrastructure development subsidies are optimal only when addressing spillovers specifically tied to infrastructure.

How can one compute the optimal place-based policies (6)-(7)? Recall that the wages w_j^* and spillover elasticities γ_j^{L*} and γ_j^{I*} entering these expressions are evaluated at the optimal allocation, and therefore are not directly observable. In principle determining these policies requires quantifying and solving the full model to identify the optimal solution. However, this difficulty disappears in one important case- when spillovers have constant elasticity. We analyze this case next.

2.3 The Case with Constant Elasticity Spillovers

We assume here that spillover elasticities are constant, both as a function of employment or infrastructure and across space:

$$\gamma_j^L = \gamma^L \text{ and } \gamma_j^I = \gamma^I. \tag{9}$$

[5] As Fajgelbaum and Gaubert (handbook) demonstrate, the same outcome can be achieved with a wage subsidy directed to workers rather than to firms. Similarly, subsidies applied to the supply side of infrastructure, rather than the demand side, can achieve the optimal provision of infrastructure.

A first question is whether, in this case, the *laissez-faire* allocation, with zero subsidies, is efficient. The dollar value of spillovers to be corrected by subsidies is given by:

$$\Gamma_j^L = \gamma^L w_j. \tag{10}$$

Without government intervention, the dollar-value of these spillovers, Γ_j^L, varies across locations because wages generally differ across space. According to (4), there are gains from reallocating labor from location i to j if

$$\gamma^L \left(w_j - w_i\right) > 0. \tag{11}$$

Thus, if the spillover γ^L is positive, then starting at the zero-subsidies allocation it is desirable to reallocate workers from low- to high-wage locations.Intuitively, high-wage locations generate larger spillovers, so a worker in a low-wage location would contribute more to social welfare if relocated to a high-wage location.

Similarly, it is optimal to distort infrastructure investment. For example, assuming a constant-elasticity production function $Y_j = A_j \left(\left(z_j L_j\right)^{\alpha} I_j^{1-\alpha}\right)^{\beta}$ and a TFP that grows with infrastructure at a constant elasticity: $A_j = A_j^0 I_j^{\gamma^A}$ with $\gamma^A > 0$, the sufficient statistics for efficient infrastructure allocation is:

$$\Gamma_j^I = \frac{\gamma^A}{\left(1-\alpha\right)\beta + \gamma^A} p_j > 0. \tag{12}$$

Starting from the no-subsidies allocation, an additional unit of infrastructure is most valuable in regions where its marginal cost p_j is higher, since a higher marginal cost reflects a higher marginal product.

According to (6) and (7),when spillover elasticities are constant, the optimal subsidies take a simple form and do not require solving the full model to be computed. The optimal subsidy per worker s_j^{L*} and per unit of infrastructure s_j^{I*} can be implemented with proportional wage and cost subsidies: firms are subsidized at a rate equal to $\frac{\gamma^L}{1+\gamma^L}$ of the prevailing wage rate and $\frac{\gamma^I}{1+\gamma^I}$ of infrastructure costs. Why does a constant-rate subsidy across space impact workers' location choices? The constant-rate subsidy is coupled with a lump-sum tax, so that workers' net earnings are $\frac{\gamma^L}{1+\gamma^L} w_j - t$, rather than w_j in the absence of the policy. Therefore, with positive spillovers, the net transfer received by a worker in a high-wage location constitutes a higher proportion of their earnings compared to a lower-wage location. This incentivizes the worker to choose the higher-wage location. In contrast to the case with non-constant elasticities, these subsidy rates can be estimated directly using the observed equilibrium, as the spillover elasticities that hold in the current equilibrium are also valid at the optimal equilibrium.

Taking stock, we conclude that welfare-enhancing reallocations driven by positive agglomeration spillovers around a competitive allocation do not point at poor or small locations as being the natural target of place-based policies. In fact, at least for labor subsidies, it is high-wage locations that are under-developed in the *laissez-faire* allocation. We discuss more general spillovers that can justify optimal reallocations into low-wage locations in the next section.

3 When do Optimal Place-Based Policies favor Low-Wage Regions?

The discussion so far has focused on the policy implications of agglomeration spillovers that impact productivity. Assuming the long-held view that these spillovers are positive, optimal transfers flow from low- to high-wage locations, both under the free-market allocation and at the optimal allocation. This result holds under very general supply-side assumptions and spillover microfoundations. It applies in virtually every spatial equilibrium model where a federal government optimally allocates population across locations, ranging from early public-finance models (Flatters et al., 1974) to recent quantitative spatial frameworks (Fajgelbaum and Gaubert, 2020).

The conclusion that efficient place-based policies should compensate high-wage locations at the expense of low-wage locations appears at odds with the structure of observed place-based policies, which typically direct transfers in the opposite direction. However, our analysis so far has included two significant restrictions. First, we constrained the nature of agglomeration spillovers in several ways: we assumed they are positive (ignoring the congestion effects of density), that they impact labor productivity only (and not residential amenities), and that they are uniform across sectors and confined to local economies without spillover effects on nearby regions. Second, we assumed homogeneous workers.

Introducing labor heterogeneity allows for more complex interactions among workers and introduces redistributive motives for policy. We now extend our analysis to include more general spillovers and worker heterogeneity, discussing circumstances under which they can lead to optimal place-based policies that favor low-income regions.

3.1 Amenity Spillovers

The appeal of a location often results from externalities that go beyond agglomeration spillovers on labor efficiency. It has long been hypothesized that quality of life, or amenities, depend on the size or demographic composition of a location. These effects can be positive such as access to differentiated services, or negative such as congestion and crime (Duranton and Puga, 2020). Regardless of the microfoundation, endogenous amenities can be introduced in the framework by assuming that local population L_j enters utility directly, so that workers in j derive utility $a(L_j)\, u(c_j, h_j)$. Households moving to a location do not internalize their impact on local amenities, leading to a market failure. Formally, we define the corresponding spillover elasticity:[6]

$$\gamma_j^A(L_j) \equiv \frac{\partial a_j / \partial L_j}{a_j / L_j}, \tag{13}$$

with $\gamma_j^A(L_j) > 0$ or $\gamma_j^A(L_j) < 0$. Consider the *laissez-faire* allocation in a constant elasticity model (i.e. where $\gamma_j^A = \gamma^A$ for all locations j). In this case, extending our previous discussion, one can

[6] Because area is fixed, introducing population directly in utility also stands in for introducing density in utility. Our discussion does not rely on the multiplicative form assumed here. The same results go through if one assumes a general utility function $u(c_j, h_j, L_j)$, by properly redefining the spillover elastic γ_j^A (see Fajgelbaum and Gaubert Handbook Chapter).

show that a reallocation of workers from j to i is desirable whenever:

$$\left(\gamma^A + \gamma^L\right)(w_j - w_i) > 0. \tag{14}$$

Moreover, an optimal allocation is characterized by the following optimal hiring subsidies:

$$s_j^{L*} = \frac{\gamma^L + \gamma^A}{\gamma^L + 1} w_j^*. \tag{15}$$

Interestingly, wages are the basis to compute the dollar value of amenity spillovers, like in the case of productive spillovers.[7] Optimal policies redistribute goes from high-wage to low-wage places whenever $\gamma^A + \gamma^L < 0$. That is, amenity spillovers must be negative, corresponding to *congestion* externalities; and congestion must be strong enough to dominate positive economies of density. In that case, the rationale to redistribute to low-wage cities is that doing so reduces overall congestion: absent corrective policies, high-wage cities are too crowded, since the dollar value of congestion generated by a marginal worker there is larger (it is proportional to the local wage) than in a low-wage location.

The analysis here shows that, depending on whether spillover elasticities are positive or negative, high-wage cities are either too small or too large in the absence of policies, respectively. Whether large cities or small cities are too small therefore depends on whether the large cities are high- or low-wage. Depending on parameters, large cities can be either high- or low-wage in a decentralized allocation, so there is no unambiguous answer to that question. The table below summarize conditions (on elasticities) such that large cities are too large in the market allocation. They depend in particular on how strong decreasing returns to labor are, i.e. on $\varepsilon_{F,L} \equiv \frac{\partial F_j / \partial L_j}{F_j / L_j}$.

Table 1: Are Large Cities Too Large or Too Small in the *Laissez-Faire* Allocation?

	$\left(1+\gamma^L\right)\varepsilon_{F,L} < 1$	$\left(1+\gamma^A\right)\varepsilon_{F,L} > 1$
$\gamma^A + \gamma^L < 0$	Too small (and low wage)	Too large (and high wage)
$\gamma^A + \gamma^L > 0$	Too large (and low wage)	Too small (and high wage)

Note: Each entry of the table states whether, in a pairwise comparison or two cities in a free-market allocation, the larger city is too small (hence it should grow at the expense of the smaller city for aggregate welfare to increase) or too large. The table also notes whether the lager city is lower- or higher-wage in the observed allocation given the region of the parameter space. $\varepsilon_{F,L}$ denotes the elasticity of output to total efficiency units, zL.

3.2 Heterogeneous Skills

As we have mentioned, the logic outlined so far extends to more complex setups in the quantitative spatial economics tradition (Redding and Rossi-Hansberg, 2017). Such models can be calibrated to match detailed data. As shown in Fajgelbaum and Gaubert (handbook chapter), optimal spatial policies can be solved numerically using these frameworks. Two recent papers offer insights into these methodologies, caveats, and findings in contexts that focus on skill heterogeneity

[7] The reason is the dollar value of amenity spillovers is proportional to expenditures, but expenditures move one for one with wages.

with more complex spillovers across types. Fajgelbaum and Gaubert (2020) explore optimal spatial sorting of U.S. workers by education level (with and without college degree). Rossi-Hansberg et al. (2019) examine optimal sorting by occupation: Cognitive Non-Routine (CNR) versus non-CNR jobs. For simplicity, we refer to these groups as high- and low-skill workers, though their definitions are somewhat different in these two papers. In these models, workers of different skill groups differ in how they value locations and in their productivity. Each group generates productivity spillovers for its own members and potentially for other groups. Workers also generate amenity spillovers that vary across groups.

Rossi-Hansberg et al. (2019) estimate productivity spillovers by regressing worker productivity (revealed through a model calibration) on city composition, using an instrumental variables (IV) strategy.[8] They find that high-skill workers benefit from positive spillovers within their group but face negative spillovers from other groups (crowding out). Low-skill workers exhibit similar but less pronounced patterns. On the preference side, Rossi-Hansberg et al. (2019) do not account for amenity spillovers, instead relying on idiosyncratic worker preferences for location as a congestion force.

They find that the optimal allocation involves more concentration of high-skill in large cities than observed. However, those cities shrink due to congestion effects. In the optimal allocation, increased sorting is driven by positive within-group and negative cross-group spillovers, promoting greater within-group clustering and discouraging cross-group co-agglomeration.

Fajgelbaum and Gaubert (2020) use spillover elasticities from existing literature, such as wage and amenity responses to city composition from Diamond (2016) and city-level agglomeration spillover from Ciccone and Hall (1996). Given those estimates, both skill groups generate positive but small productivity spillovers. The amenity spillovers, however, play a larger role: high-skill workers create positive amenities for both groups, while low-skill workers generate negative amenity spillovers, a key difference with Rossi-Hansberg et al. (2019). Fajgelbaum and Gaubert (2020) also include existing transfers in their parametrization. To estimate these transfers, they use welfare transfers data from the Census and tax data from the BEA, adjusting for socio-demographic factors.

They find that, in the optimal allocation, large cities shrink due to congestion effects. Optimal spatial sorting is less pronounced than the current distribution, as high-skill workers are incentivized to move to smaller cities where they generate positive spillovers for low-skill workers. Still, in certain high-wage cities, high-skill clustering intensifies due to strong within-group spillovers in highly productive areas.

This area of quantitative research is ripe for further exploration. Estimating spillover elasticities—particularly across different worker groups—remains a major challenge. The measurement of existing transfers could benefit from more precise approaches. A deeper analysis of local and federal government budgets could also more accurately trace existing spatial transfers. Systematically collecting micro-data on interregional transfers managed by different agencies will help provide a

[8] Following Ciccone and Hall (1996), they instrument for current population using historical population, and use Card (2001) and Moretti (2004) to instrument for skill composition via historical immigrant populations and land-grant colleges.

more granular view of fiscal redistribution (see Hanson and Rodrik in this volume). Addressing these gaps would significantly improve the empirical foundations of optimal spatial policy design.

3.3 Place-based Redistribution

Placed-based policies may be motivated by purely redistributive reasons. In this case, the efficiency loss entailed by redistribution and labor reallocation to low-wage places is accepted as the cost of addressing inequality concerns.The logic parallels that of income taxation: while it introduces efficiency costs by discouraging work, it serves to reduce inequality through redistribution. Naturally, place-based redistribution is inherently justified if the government cares about the level of income of a place *per se*.[9] It is not obvious, however, whether it is justified based on inequality concerns across individuals, independent of where they live. For place-based redistribution to be warranted on these grounds, it must address gaps that income taxes and other means-tested transfers alone cannot address. Atkinson and Stiglitz (1976) provide conditions under which other forms of taxation are unnecessary if an income tax system is available for redistribution.

Gaubert et al. (2024) examine whether, to tackle inequality concerns, spatially targeted subsidies towards distressed areas can improve upon purely income-based redistribution. To tackle this question, we exclude spillovers from the model but imagine there are different household types θ with varying income-earning abilities. Individuals in different groups may make different location choices, leading to spatial sorting.[10] In region j, $L_j(\theta)$ residents belong to group θ, earn wages $w_j(\theta)$, and pay taxes according to an income tax schedule $t()$ that is independent of location.

The key question is: what is the impact on social welfare—defined as the sum of individual utilities with group-specific weights—of implementing a small, budget-neutral subsidy in a distressed region? We consider a simple place-based redistribution scheme where residents of a very low-income (or "distressed") region j receive a per-capita subsidy funded by a per-capita tax levied on residents of other regions i. The distressed region may be low income due to low productivity or the sorting of low income workers. The welfare impact of such a subsidy depends on both its redistributive benefits and the associated fiscal costs. To a first order approximation, the social welfare gain from place-based redistribution is:

$$\text{Welfare Gain of Place-Based Redistribution} = \bar{\lambda}_j - \bar{\lambda}_i + \sum_{\theta} \left[t\left(w_j\left(\theta\right)\right) - t\left(w_i\left(\theta\right)\right)\right] dL_j\left(\theta\right).$$

Here, $\bar{\lambda}_j$ measures the social welfare gain from transferring an additional dollar of income to the distressed region j. Therefore, $\bar{\lambda}_j - \bar{\lambda}_i$ summarizes the relative value of redistribution to region j compared to the rest of the country i. This value is higher the stronger is the equity motive in

[9] A striking example comes from Argentina in the 2010s, when an enterprise zone program incentivized foreign multinationals to establish factories in Ushuaia, the southernmost city in the world and the closest populated point to Antarctica.

[10] We assume here that individuals supply different amounts of efficiency units, but their efficiency units are perfect substitutes. As a result, there are no efficiency costs in production from place-based redistribution, and all the costs are summarized by fiscal externalities. Including standard production functions with complementarities between skills would imply further efficiency costs.

social welfare or, with concave utility, the lower is average income of residents in j .

The term $\sum_{\theta}\left[t\left(w_j\left(\theta\right)\right)-t\left(w_i\left(\theta\right)\right)\right]dL_j\left(\theta\right)$ captures the fiscal cost from redistribution. When people move to j to earn the subsidy, their income tax contributions typically decrease (as wages in j are lower), creating a fiscal externality that offsets the benefit of redistribution. As long as this fiscal cost of migration is not prohibitive compared to the social value of redistribution, place-based subsidies remain desirable. This summarizes the fundamental equity-efficiency trade-off of taxation in the case of place-based redistribution.

When Is Place-Based Redistribution Desirable? Whether this form of redistribution can increase social welfare depends on various factors. First, it depends on why distressed regions have lower-earnings. If high- and low-skilled individuals vary in preferences for location, so that the rich prefer living in i, then place is a useful tag for redistribution. Second, it depends on the mobility of workers, and specifically on whether the subsidy leads to large reallocations, the and pre-tax earnings of movers drop when they move to the laggard region. Suppose for example that the high skill sort into i because high-skilled jobs are only available there while low-skilled jobs are more evenly distributed with a common wage. In this case, only low-skill workers move from i to j without a loss of earnings. In this scenario, there is no efficiency cost of place-based redistribution.

However, certain conditions can undermine the case for place-based redistribution. First, in many cases such as in the last example, place-based redistribution may increase segregation by skills. This could be costly on efficiency grounds due to forces we have assumed away in this discussion, such as standard complementarities in production or positive spillovers from high-skill workers. Second, if the cost of living in region i is much higher than in region j, for instance, redistribution toward i could be more equitable. Third, if high-skilled individuals have jobs in both locations but are significantly more productive in region i, incentivizing them to remain there becomes economically rational, as the cost of their moving to the low productivity location could outweigh the equity benefits of place-based-redistribution. Therefore, if spatial income disparities are primarily a result of productivity differences between regions, the benefits of place-based redistribution are less certain.

Place-Based Redistribution and Restricted Mobility The canonical model we have considered in section 2 assumes that individuals are fully mobile. Following a positive economic shock to a given region, individuals move there until the price of factors (local wage and housing costs) adjusts to restore an equal utility level in all regions. In reality, mobility is restricted. In static economic models, this restricted mobility is modeled by assuming that not all individuals respond similarly to economic shocks in a region due to their unique personal characteristics. This heterogeneity is modeled through idiosyncratic preference (or cost) shocks that reflect each individual's attachment to a particular location. These personal shocks explain why some people remain in place despite apparent economic incentives to move, effectively mimicking the limited mobility that is often measured empirically (even after rather large economic shocks).

Given these individual differences, what happens to optimal place-based transfers? The efficiency motives behind place-based policies remain unchanged, and identical to the one studied in section 2. That is, place-based policy motivated on efficiency grounds depends solely on the presence of agglomeration externalities, regardless of the extent of restricted mobility due to individual shocks. However, these individual shocks for location create an additional redistributive motive for place-based transfers because governments cannot observe these shocks or lack tools to target individuals based on these shocks. A government focused on limiting inequality may now be incentivized to tax individuals whose personal characteristics are such that they chose to reside in (and are attached to) high-productivity areas, where real consumption is high and the marginal utility of a dollar is low, and redistribute to individuals who based on their preference shocks are attached to low-wage areas, where the marginal utility of a dollar is higher.[11]

4 Lessons from the Theory

The theory we presented here is quite general, encompassing the models that are typically used in policy discussions on place-based policies motivated by agglomeration externalities or under-investment in infrastructure. The model is agnostic regarding the specific microfoundation of spillovers, which could arise, for instance, from Marshallian externalities or the benefits of access to thick input markets, among other sources (Duranton and Puga, 2004). Spillovers may also be negative, for example due to efficiency loss from increased commuting times, as in systems-of-cities models. Different microfoundations manifest in distinct functional forms for the spillover functions $\gamma_j^L(L_j)$ and $\gamma_j^I(I_j)$. The optimal policy formulas indicate that what matters is the elasticity of these functions, multiplied by wages (for hiring subsidies) or infrastructure costs (for infrastructure subsidies).

Through the lens of this general model, we obtain six general takeaways that revisit in part some conclusions from the previous literature.

Lesson 1: The decentralized spatial allocation is generically inefficient, even when spillover elasticities are the same everywhere. A strong prior in the place-based policy literature is that spatial allocation is efficient when the agglomeration elasticity is constant across space, $\gamma_j^L = \gamma^L$. This view is expressed in influential contributions. For instance, Glaeser and Gottlieb (2008) write that *"Despite the existence of externalities (...) there are no welfare gains from reallocating people across space. The key to this result is that our functional forms imply that the elasticity of welfare with respect to population is constant."* Similarly, Kline and Moretti (2014a) note that "*although agglomeration economies generate market failures at the local level, these ineffi-*

[11] Formally, if these idiosyncratic preferences follow either a Fréchet distribution that multiplies consumption or a logit shock that is additive with log-utility of consumption, two modeling choices that have been very popular in the literature, the resulting optimal transfer resembles that of an efficiency-driven transfer in a model with negative amenity spillovers (i.e., congestion effects). However, the interpretation here is distinct: the transfer serves purely redistributive purposes, designed to balance welfare among heterogeneous individuals based on the varied economic contexts of their chosen locations.

ciencies may "cancel out" in the aggregate if agglomeration elasticities are constant." The intuition for this prior is summarized by Duranton and Venables (2018): *"When cluster expansion occurs because of labour relocation from other areas, agglomeration gains in the targeted area will come at the expense of agglomeration losses elsewhere. In the specific case where the agglomeration elasticity is constant, the gains in the targeted area will be exactly offset by the losses elsewhere".* Literature reviews by Kline and Moretti (2014b) and Neumark et al. (2015) also reflect this perspective.

In contrast to these views, we have shown that the market allocation is inefficient even when spillover elasticities are constant. The reason is that the critical factor for policy is the dollar value of the spillover, $\Gamma_j^L = w_j \gamma^L$, which varies across locations due to differences in wages, rather than just the elasticity γ^L itself. Hence, spatial differences in γ_j^L, perhaps due to nonlinearities as a function of population size, are not necessary to justify policy intervention (though such heterogeneity would, of course, influence optimal policies if present).

This misconception in the literature may be rooted in assuming away spatial transfers. Transfers create imbalances between the production and consumption of tradeables, and these transfers are essential for incentivizing spatial reallocations when there is free labor mobility. However, Glaeser and Gottlieb (2008) and Kline and Moretti (2014a) study welfare impacts of labor reallocations while assuming zero transfers.

This approach has three potential issues. First, without transfers, only one allocation –the market allocation– is consistent with free labor mobility. Any alternative allocation would involve differences in utility across space, conflicting with the concept of free mobility. Any other zero-transfer allocation requires forced migration. Second, transfers enable Pareto improvements whether labor mobility is free or constrained by forced migrations. Thus, if transfers are allowed, the zero-transfers market allocation is inefficient. Third, the place-based policies we consider –wage subsidies implemented by a federal government– involve payment imbalances across regions, with some regions as net contributors and others as net beneficiaries. Therefore, transfers are necessary to think about these policies. In sum, our conclusions differ from previous research because our analysis accounts for transfers and for their effects on welfare and mobility.[12]

Lesson 2: A national space-invariant wage subsidy coupled with a lump sum tax is optimal when the spillover elasticity is common across space The prevailing view in the literature that the market allocation is efficient under constant elasticity spillovers has motivated the search for non-linearities in agglomeration spillovers: Glaeser and Gottlieb (2008) write that *"Without a better understanding of nonlinearities in these externalities, any government spatial policy is as likely to reduce as to increase welfare."* Having empirically ruled out these non-linearities,

[12]In cases with fixed factors in production or consumption such as land, the optimal allocation can also be implemented by taxing local fixed factors in j to finance the subsidies paid to firms in j, a generalization of the Henry-George Theorem (Fajgelbaum and Gaubert Handbook chapter). Such a policy also materializes as a particular distribution of spatial imbalances. Therefore, regardless of the revenue source for the subsidies, either via taxing local factors as in the Henry-George Theorem (if feasible) or via a lump-sum tax on workers as we have assumed, the optimal allocation features (the same) payment imbalances. We note our proposed implementation is feasible even in cases where taxing local factors to finance local subsidies is not, or even without fixed local factors.

Kline and Moretti (2014a) conclude in that *"Spillovers in manufacturing appear to be the rare example of a localized market failure that cancels out in the aggregate."*

Our results demonstrate, in contrast, that non-linearities are not necessary to justify government policies. With constant elasticity spillovers, the dollar subsidy per worker, $\frac{\gamma^L}{1+\gamma^L} w_j^* - t^*$, does vary in space. However, the policy that implements this transfer per capita is spatially invariant. The optimal policy consists of a wage subsidy paid to firms equal to a fraction $\frac{\gamma^L}{1+\gamma^L}$ of the prevailing wage, and to an input subsidy equal to a fraction $\frac{\gamma^I}{1+\gamma^I}$ of the infrastructure cost, plus a common lump-sum tax t^* for all workers. In the case of labor, this result is somewhat counterintuitive: although labor supply is fixed at the national level, subsidizing labor everywhere enhances welfare. One might expect a spatially flat-rate subsidy to only have aggregate effects by increasing overall factor usage; however, a flat subsidy rate paired with a lump-sum tax can distort the allocation in a welfare-enhancing way by varying the per-capita transfer spatially.[13] A strong policy implication is that targeting specific regions is not necessary to implement the optimal spatial allocation: a nationally *untargeted* wage subsidy s^*, coupled with the lump-sum tax t^*, allows the allocation adjusts efficiently. A positive and constant agglomeration elasticity justifies a national wage subsidy.

Lesson 3: Beyond the constant-elasticity case, the optimal subsidy rate to a region equals its spillover elasticity Austin et al. (2018) write that *"unless we understand the spatial heterogeneity of agglomeration effects, the existence of agglomeration does not justify spatially heterogeneous polices"* (p.19). Our results support this view. Spatially heterogeneous policies, defined as heterogeneous wage or infrastructure subsidy *rates* in space, are justified only if the agglomeration elasticities γ_j^L and γ_j^I vary in space. In practice, only a few studies quantify optimal spatial policies with heterogeneous elasticities (Fajgelbaum and Gaubert, 2020; Rossi-Hansberg et al., 2019; Au and Henderson, 2006). The general finding from these studies is that heterogeneity in elasticities tends to magnify potential gains from optimal spatial policies. However, a lot of uncertainty about the values of these heterogeneous spillovers remains.

Lesson 4: Place-based policies that favor low-wage locations on efficiency grounds are justified under either negative effects from density, higher spillover elasticities in low-wage locations, or across-skill spillovers that favor more mixing in low-wage areas The analysis demonstrates that optimal subsidies to richer, high-wage regions can be easily justified by the presence of positive and constant agglomeration spillovers. This result is robust to many model extensions. The rationale for redistributing to poorer, laggard regions to improve efficiency requires more assumptions. Such redistribution, to be justified on efficiency grounds, requires heterogeneity in spatial externalities, such as higher spillover elasticities in poorer regions (as suggested by Austin et al. (2018)), sufficiently negative congestion spillovers from density that impact productivity or amenities, or significant heterogeneity in spillovers across skill groups to justify more mixing of high

[13] We also note that the subsidy s_j^{L*} is a gross payment worker to a location. The net transfer per worker to a location is $s_j^{L*} - t^*$ where t^* is a lump-sum tax.

and low skill workers in low-wage locations. Additionally, redistributing to low-wage regions can be justified on purely redistributive grounds to address equity concerns.

Lesson 5: Government spending on infrastructure, investment incentives, or housing policies cannot optimally deal with agglomeration spillovers generated by labor density. The optimal policy prescriptions follow a principle of targeting: the optimal policy targets the distorted margin only (Bhagwati and Johnson, 1960; Dixit, 1985). This principle holds regardless of general-equilibrium ramifications. Externalities generated by labor are optimally addressed through direct subsidies to labor. Subsidizing investment or housing to attract workers to a given location would distort those markets, potentially expanding employment in a welfare-enhancing way, but such policies are neither necessary nor sufficient to achieve an optimal allocation. The same logic applies to government spending on infrastructure, which in our framework corresponds to a local subsidy to finance infrastructure I_j. This policy is suboptimal for addressing externalities created by labor.

The fact that these policies alone are insufficient to achieve an efficient allocation does not mean they cannot improve welfare if the ideal instrument (labor subsidies) is restricted or unavailable. For instance, starting from a market allocation without wage subsidies, labor agglomeration spillovers could be partially addressed through infrastructure investment subsidies. Kline and Moretti (2014a) ask a related question: how the welfare gain from infrastructure improvements depends on the magnitude of agglomeration spillovers for labor. We can ask that question here. Starting from an initial equilibrium with no subsidies (neither for infrastructure nor labor), we introduce a change in investment subsidies that leads to a reallocation dI_j. These reallocations, in turn, induce changes in labor dL_j. As a result, from (2), the welfare gains are:

$$\text{Welfare Gain from Reallocations} = \sum_j \gamma_j^L w_j dL_j + \sum_j \gamma_j^I p_j dI_j. \tag{16}$$

The second term in this expression is the direct effect of the change in infrastructure and the first term is the indirect effect through labor reallocations. The indirect effect can be welfare-enhancing if it reallocates labor in the right direction (i.e., from locations with high $\gamma_j^L w_j$ to those with low $\gamma_j^L w_j$). Since employment tends to increase in locations receiving infrastructure, it follows that, around a market allocation without hiring subsidies to address labor density spillovers, second-best investments in infrastructure can improve welfare welfare if, other things equal, they favor high-wage or high-spillover elasticity locations.

Kline and Moretti (2014a) derive an interesting special case. They assume no fixed factors in the economy (or a fixed factor that is owned by absentee landowner and not counted towards welfare), constant-elasticity spillovers $\gamma_j^L = \gamma^L$, and exogenous costless shifts dI_j (not financed by reallocations away from other locations or from consumption). In that case, the first term of (2) vanishes so that γ^L does not enter in welfare. This term captures the indirect impact of infrastructure improvements through labor reallocations. As a result, in this case, there is no second-best role for infrastructure investments in correcting distortions from spillovers, even though

a first-best solution through labor subsidies remains valid.

Lesson 6: The housing supply elasticity does not matter to determine optimal policy The optimal rates for wage and infrastructure subsidy are *only* a function of the spillover elasticities. While we presented this result in a somewhat restricted model (for example, with a constant supply of housing), Fajgelbaum and Gaubert (handbook chapter) demonstrate that all the results we have discussed hold in a more general model with an arbitrary production structure. The framework can include features such as trade costs, many goods, a general input-output structure and a flexible housing supply. Therefore, the demand and supply elasticities of different sectors of the economy do not affect the design of optimal policies.

One might initially believe that housing supply elasticities are relevant for determining optimal policies because they affect how local house prices adjust in response to increased labor agglomeration. However, this is not the case. The optimal policy is a wage subsidy rate determined only by the agglomeration spillover elasticity. Housing supply elasticity does affect the incidence of the policy—that is, which factors benefit most from the policy. For this reason (though not for efficiency reasons), it could prompt additional government interventions aimed at redistributing the gains between different stakeholders in the economy (e.g., labor and landowners, treated here as one group).

In summary, while housing congestion and supply elasticity impact the welfare gains and the incidence of the optimal policy, they do not affect the specific structure of an efficient policy.

5 Conclusion

We summarize the takeaways from a simple theory of place-based policies and show that there is generally a case for place-based policies to increase efficiency whenever spatial externalities are at play, whatever their shape, in contrast with the conclusion of previous literature. The analysis reveals that it is easy to justify a optimal subsidies to richer regions on the basis of positive agglomeration spillovers. However, the case for redistributing to laggard regions in order to increase efficiency is more convoluted, requiring either heterogeneity of spatial externalities with higher spillover elasticities in poorer regions (as suggested by Austin et al. (2018)) or sufficiently negative congestion spillovers from density operating either through efficiency or amenities.

To make progress on policy-relevant conclusions, it is therefore important that the empirical literature brings in new evidence on the magnitude of spillovers. In an influential study on place-based policies, Glaeser and Gottlieb (2008) were cautious about any place-based policies conducted for efficiency reasons as they rely on knowledge of elasticities that are very hard to estimate. However, recent advances in data access and analysis are very promising in that respect, as researchers have started to leverage big data that can be used to estimate granular spillover effects (Atkin et al., 2022; Couture et al., 2024). As newer estimates become available, it may be time to reassess the desirability of place-based policies empirically.

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A Derivations

A.1 Market Allocation

We define the equilibrium of a market allocation of the model used throughout this article.

First, tradeable goods are produced using labor and infrastructure, with subsidies on each:

$$\Pi_j^Y = \max A_j F_j \left(\underbrace{z_j L_j}_{N_j}, I_j \right) - \left(w_j - s_j^L \right) L_j - \left(p_j - s_j^I \right) I_j$$

leading up to the first order conditions on efficiency units and infrastructure,

$$[N_j] : A_j z_j \frac{\partial F_j}{\partial N_j} = w_j - s_j^L \tag{17}$$

$$[I_j] : A_j \frac{\partial F_j}{\partial I_j} = p_j - s_j^I \tag{18}$$

Second, workers solve

$$v_j = \max u_j \left(c_j, h_j \right) \tag{19}$$

subject to the budget constraint

$$x_j = c_j + R_j h_j = w_j + \pi - t \tag{20}$$

where aggregate returns to fixed factors are:

$$\pi = \frac{\sum_j R_j H_j + \Pi_j^Y}{L}. \tag{21}$$

Third, workers are perfectly mobile so that in all populated locations:

$$v_j = \max u_j \left(c_j, h_j \right) = u. \tag{22}$$

Fourth, markets clear, specifically:

- the government budget clears,

$$tL = \sum s_j^I I_j + \sum s_j^L L_j, \tag{23}$$

- the goods market clears,

$$\sum_j c_j L_j + \sum_j p_j I_j = \sum_j A_j (I_j) F_j (z_j (L_j) L_j, I_j), \tag{24}$$

- the national labor market clears,

$$\sum_j L_j = L, \tag{25}$$

- and the housing market clears,

$$h_j = \frac{H_j}{L_j}. \tag{26}$$

A.2 Perturbation of an Equilibrium

Consider a perturbation (dc_j, dL_j, dI_j) around a market allocation. Using the feasibility condition (24) and the first-order conditions (17) and (18) yield:

$$\sum_j dc_j L_j + \sum_j c_j dL_j = \sum_j \left[A_j' (I_j) F_j - s_j^I\right] dI_j + \left(w_j - s_j^L\right) \left(\gamma_j^L + 1\right) dL_j. \tag{27}$$

Using the spatial mobility condition (22) with equality, the consumer's problem implies that indirect utility is equalized in space across populated locations:

$$v_j (x_j, R_j) = u \tag{28}$$

Totally differentiating this condition and the individual budget constraint yields:

$$dc_j = \frac{x_j}{\varepsilon_{v_j,x_j}} \frac{du_j}{u_j} + (x_j - c_j) \frac{dL_j}{L_j} \tag{29}$$

where ε_{v_j,x_j} is the elasticity of v_j with respect to x_j. Combining (27) and (29) and using (25) yields:

$$\frac{du}{u} \frac{1}{\chi} = \sum_j \left(\gamma_j^L w_j - \left(\gamma_j^L + 1\right) s_j^L\right) dL_j + \sum_j \left(A_j' (I_j) F_j - s_j^I\right) dI_j. \tag{30}$$

where $\chi \equiv \left(\sum_j \frac{x_j}{\varepsilon_{v_j,x_j}} dL_j\right)^{-1}$. Further using (18),

$$\frac{du}{u} \frac{1}{\chi} = \sum_j \left(\gamma_j^L \left(w_j - s_j^L\right) - s_j^L\right) dL_j + \sum_j \left(\gamma_j^I \left(p_j - s_j^I\right) - s_j^I\right) dI_j. \tag{31}$$