Place-based Policies; Discussion of Kline and Moretti, *ARE* 2014

Nathan Schiff
Shanghai University of Finance and Economics

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Kline, Patrick and Moretti, Enrico, “People, Places, and Public Policy: Some Simple Welfare Economics of Local Economic Development Programs, *Annual Review of Economics*, 2014

Raising Local Welfare

In the open-city version of the monocentric city model, what happens to utility if a city decreases transportation cost (ex: builds a more efficient road)?

In the Roback model, do cities with better consumer amenities offer higher utility?

Spatial equilibrium models suggest all improvements to a location are counter-balanced by an increase in housing prices (and sometimes a decrease in wages)

Yet regional governments throughout the world often implement “place-based” policies, or policies created to help people in a specific location

Is it possible to help people in a specific place? Is this efficient?

Examples of Place-based Policies

- Tennessee Valley Authority:
  - Enormous infrastructure program (electricity, roads, canals, flood control) to improve quality of life in poor area during US Depression (part of President Roosevelt's New Deal, created 1933)
  - Considered example of "big push" development policy to move area's economy past a threshold where feedback effects would lead to further development. See discussion and evaluation in Kline and Moretti (QJE 2014)
- Enterprise zones in US: policies intended to help neighborhoods, often with the goal of decreasing unemployment. See discussion in Neumark and Simpson (2015)
- Large subsidies (tax credits) to companies for locating in a specific area. Ex: $102 million to Panasonic for locating in Newark, NJ, $307 million to Ford for locating plants in Kentucky, $232 million to Samsung for a plant in Austin, TX.

Are there place-based policies in China?

Place-based Policies in China

Zheng et al, "The birth of edge cities in China: Measuring the effects of industrial parks policy," JUE 2017

Howell, Anthony, "Heterogeneous impacts of China's economic and development zone program", JRS 2019

Lu et al, "Place-Based Policies, Creation, and Agglomeration Economies: Evidence from China's Economic Zone Program", AEJ: Ec Policy 2019

Jia et al, "Place-based policies, state-led industrialisation, and regional development: Evidence from China's Great Western Development Programme", EER 2020

Fan, Jingting and Zou, Ben, "Industrialization from scratch: The "Construction of Third Front" and local economic development in China's hinterland", JDE 2021

Fang et al (including Huang Zibin), "Place-Based Land Policy and Spatial Misallocation: Theory and Evidence from China," WP 2022

Fischer, Thomas, "Spatial Inequality and housing in China," JUE 2023

Motivating Questions

Why might we be skeptical of place-based policies? If people in a given location are poor, what's an alternative way to help them?

Why do spatial equilibrium models suggest all welfare improvements are counter-balanced? What is the key assumption that must be relaxed in order for a place-based policy to have an effect in a specific place?

How do Kline and Moretti (2014) relax this assumption?

If a place-based policy *does* have a local effect, who is helped? Why might this depend on the housing market?

Are place-based policies efficient (no DWL)? If not, what is the source of this DWL?

Under what conditions could a place-based policy be (globally) efficient?

Place-based Policies and Market Imperfections

KM suggest five types of market imperfects that could justify place-based policies:

1. Public Goods: these are usually under-provided by private sector (roads, infrastructure, public safety)
2. Agglomeration Economies: externalities through proximity are not fully internalized by firms
3. Labor Market Frictions/Rigidities: labor market institutions can raise unemployment (matching problems, wage bargaining, hiring costs)
4. Missing Insurance/Credit Constraints: ex: workers can't borrow enough to move
5. Pre-Existing Distortions: for ex., taxes based on nominal income penalize workers in productive places

Basic Model of Two Cities with Migration and Heterogeneous Location Preferences

Basic Set-up: Two Cities, Mobile Workers, Location Preferences

There are two cities, $c \in a, b$, and the mass of workers across both cities sums to 1: $N_a + N_b = 1$

All workers supply one unit of labor inelastically and rent a housing unit with city-specific rent r_c

Worker i in city c has utility:

$$U_{ic} = w_c - r_c + A_c - t + \epsilon_{ic} = V_c + \epsilon_{ic} \quad (1/2)$$

Worker earns nominal wage w_c (real wage is $w_c - r_c$), A_c is exogenous city amenity level

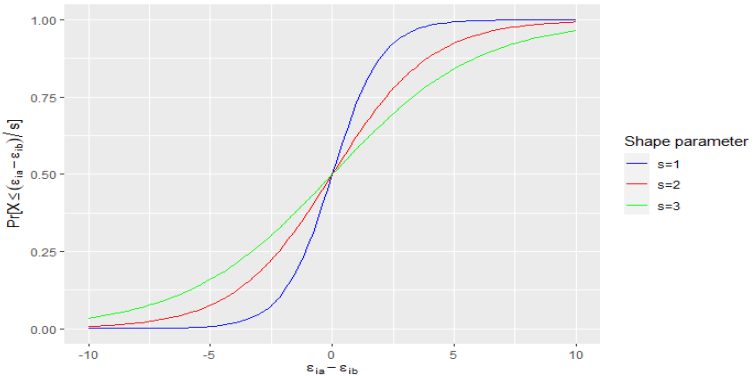
The ϵ_{ic} is an i.i.d match between worker and each city, assumed type 1 EV, yielding a logit model of city choice

Larger value of ϵ_{ic} indicates greater individual preference for city c

Location Preferences and City-specific Match ϵ_{ic}

$$\frac{\epsilon_{ia} - \epsilon_{ib}}{s} \sim Logistic(0,1); \quad CDF: \; F(x) = \frac{exp(x)}{1 + exp(x)} \tag{3'}$$

As s increases from zero, idiosyncratic preference matter more ($s = 0$ only V_c matters)



Production

Firms produce a single good with a Cobb-Douglas production function, and sold at a price of one

$$Y_c = X_c N_c^{\alpha} K_c^{1-\alpha} \tag{4}$$

The var X_c is productivity shifter, N_c is labor with price w_c, and K_c is capital with global price ρ; note that firms do not use land in production, a key difference from Roback

Place-based policy is an advalorem *wage credit* financed by the lump sum tax across all workers (remember that $N_a + N_b = 1$):

$$w_a \tau_a N_a + w_b \tau_b N_b = t \tag{5}$$

KM note that this wage credit is similar to the policy in "Empowerment Zones," where wage subsidies are paid to workers living and working in the zone

Profit Maximization and Inverse Labor Supply

The price of output Y is one and thus firm profit is:

$$\Pi_c^Y = X_c N_c^{\alpha} K_c^{1-\alpha} - w_c N_c - \rho K_c \tag{5.1}$$

The first order conditions for profit maximization (input price=marginal revenue product) are:

$$w_c(1-\tau_c) = \alpha X_c N_c^{\alpha-1} K_c^{1-\alpha} \quad \textit{and} \quad \rho = (1-\alpha) X_c N_c^{\alpha} K_c^{-\alpha} \tag{6'}$$

Substituting the capital condition into the labor condition and taking logs yields:

$$ln(w_c) = C + \frac{ln(X_c)}{\alpha} - \frac{1-\alpha}{\alpha} ln(\rho) - ln(1-\tau_c), \quad \textit{where } C \equiv ln(\alpha) + \frac{1-\alpha}{\alpha} ln(1-\alpha) \tag{7}$$

The labor demand curve is perfectly elastic at w_c, which depends on a city's productivity X_c and wage subsidy τ_c

Housing

The housing construction industry is perfectly competitive but with limited land

Firms thus produce where price equals marginal cost, with an upward sloping marginal cost curve (due to land)

$$r_c = z_c N_c^{k_c} \tag{8}$$

This inverse supply has constant elasticity k_c; $k_c = 0$ is perfectly elastic supply

Var z_c is a housing productivity shifter (greater z_c means higher cost)

All land is owned by absentee landlords with profit:

$$\Pi \equiv \int_0^{N_c} (r_c - z_c x_c^{k_c}) dx = \frac{k_c}{k_c + 1} r_c N_c \tag{9}$$

Equilibrium

A worker chooses city a if it yields the largest utility, which can be stated as $\epsilon_{ib} - \epsilon_{ia} < V_a - V_b$

The equilibrium condition can thus be stated as the fraction of workers choosing a is equal to the population of a, N_a

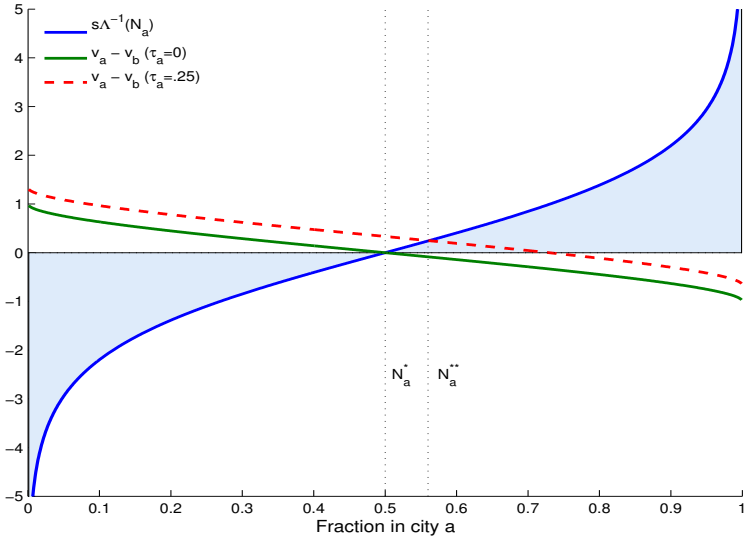
$$N_a = \Lambda\left(\frac{V_a - V_b}{s}\right) = \frac{exp(\frac{V_a - V_b}{s})}{1 + exp(\frac{V_a - V_b}{s})} \tag{10}$$

Rewriting in inverse form, where $\Lambda^{-1}(p) = ln(p/(1-p))$ is the logit quantile:

$$s\Lambda^{-1}(N_a) = s * ln\left(\frac{N_a}{1 - N_a}\right) = s * ln\left(\frac{N_a}{N_b}\right) = (w_a - w_b) - (r_a - r_b) + (A_a - A_b) \tag{12}$$

Equilibrium and Welfare

Figure 1: Equilibrium



Equilibrium Components

$$s\Lambda^{-1}(N_a) = s * ln\left(\frac{N_a}{1-N_a}\right) = s * ln\left(\frac{N_a}{N_b}\right) = (w_a - w_b) - (r_a - r_b) + (A_a - A_b) \quad (12)$$

$$s\Lambda^{-1}(N_a) = \underbrace{\frac{e^C}{\rho^{\frac{1-\alpha}{\alpha}}}\left(\frac{X_a^{\frac{1}{\alpha}}}{1-\tau_a} - \frac{X_b^{\frac{1}{\alpha}}}{1-\tau_b}\right)}_{\text{Wage Difference}}$$

$$\underbrace{-(z_a N_a^{k_a} - z_b(1-N_a)^{k_b})}_{\text{Rent Difference}} + \underbrace{A_a - A_b}_{\text{Amenity Difference}} \quad (12.1)$$

Note: counterintuitively, the rent difference is decreasing in k_a

Equilibrium in mathstud.io

First paste function code (6 lines) and hit enter. You will have to replace the "^" symbol (just delete and retype it) because the pasted character is not recognized by mathstud.io.

```
@vdiff(Na,alpha,rho,Xa,Xb,taua,taub,ka,kb,za,zb,Aa,Ab)
C=ln(alpha)+((1-alpha)/alpha)*ln(1-alpha)
wagediff=(exp(C)/rhoˆ((1-alpha)/alpha))*((Xaˆ(1/alpha)/(1-taua))-(Xbˆ(1/alpha)/(1-taub)))
rentdiff=za*Naˆ(ka)-zb*(1-Na)ˆkb
amenitydiff=Aa-Ab
wagediff-rentdiff+amenitydiff
```

Then paste plotting code (9 lines) and hit enter

```
Slider(tauA,0,1)
Slider(s,0,2,0.1,1)
Slider(zA,0,2,0.1,1)
Slider(Aa,0,2,0.1)
Slider(kA,0,2,0.1,0.5)
Slider(xA,0,2,0.1,1)
Plot(vdiff(x,0.5,0.25,1,1,0,0,0.5,0.5,1,1,0,0),x=[0,1],y=[-5,5],color=green)
Plot(vdiff(x,0.5,0.25,xA,1,tauA,0,kA,0.5,zA,1,Aa,0),x=[0,1],y=[-5,5],color=red)
Plot(s*ln(x/(1-x)),x=[0,1],y=[-5,5],color=blue)
```

Comparative Statics and Welfare

Effect of Increasing Subsidy τ_a

Increasing the wage subsidy for a raises nominal wages and population

$$\frac{dw_a}{d\tau_a} = \frac{w_a}{1-\tau_a} \tag{13}$$

The increase in population is larger when idiosyncratic preferences are weaker (smaller s) and when housing supply is more elastic (smaller k_a [1])

$$\frac{dN_a}{d\tau_a} = \frac{N_a N_b}{s + k_b r_b N_a + k_a r_a N_b} \frac{w_a}{1-\tau_a} > 0 \tag{14}$$

Rents in city a increase while decreasing in b; increase in a is larger when k_a is larger, decrease in b is larger for larger k_b (decrease in pop drops prices quickly when inelastic)

[1] The effect of housing supply elasticity is a bit confusing. When elasticity is higher (smaller k values), then an increase in τ_a will have a larger effect. This is the cross-derivative: $\frac{\partial^2 N_a}{\partial \tau_a \partial k_a} < 0$

Effect of Increasing Subsidy τ_a on Real Wages

While both nominal wages and rents increase in city a, nominal wages increase more, making real wages increase:

$$\frac{w_a - r_a}{d\tau_a} = \frac{s + k_b r_b N_a}{s + k_b r_b N_a + k_a r_a N_b} \frac{w_a}{1 - \tau_a} \tag{14}$$

Further, real wages also increase in city b

In b the nominal wage is unaffected, but the decrease in population lowers rent, raising the real wage

When labor is infinitely mobile ($s = 0$) then real wages increase equally in both cities, similar to canonical spatial equilibrium models

Welfare

Total welfare in the model is the sum of worker utility and landlord profits

Assumption of logit model implies worker welfare is expected utility of choosing city with largest utility:

$$V \equiv E \max\{U_{ia}, U_{ib}\} = s * log(exp(V_a/s) + exp(V_b/s)) \tag{18}$$

Landlord profits are increasing in housing prices; housing price in a city is an increasing function of population

If a policy causes workers to move from one city to the other, then destination city landlords will have increased profits while origin city landlords lose profit

Size of effect will depend on housing supply elasticity in each city

Welfare

Basic model has complete markets and no externalites, most efficient place-based policy is no policy $\tau_a = \tau_b = 0$

Implementing a subsidy in *a* increases welfare in *a*, but less than the loss in *b*

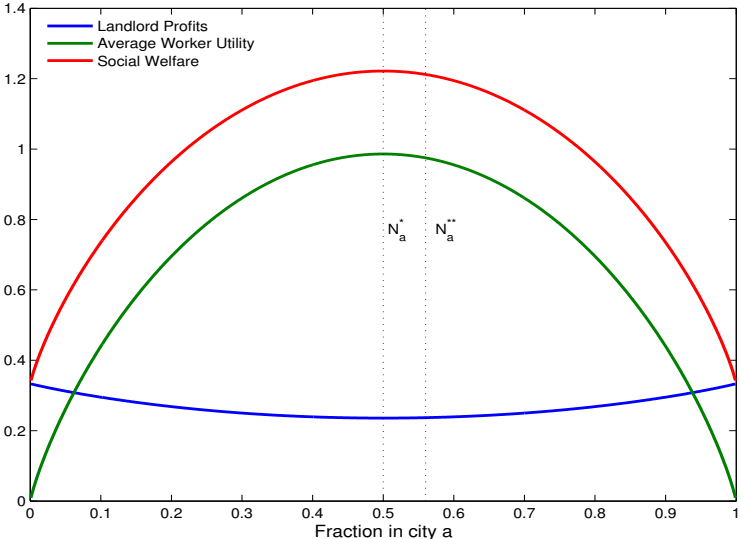
Some of the subsidy increases utility for workers in *a* and increases landlord profits in *a*, while lowering both in *b*

Further, there is a DWL because some workers in *b* move to *a*, but their gain in utility is less than the subsidy cost (note that these workers value *a* less than any of the original residents—have smaller $\epsilon_{ia} - \epsilon_{ib}$)

To show intuition, authors plot welfare for symmetric equilibrium, considering changes in τ that move population

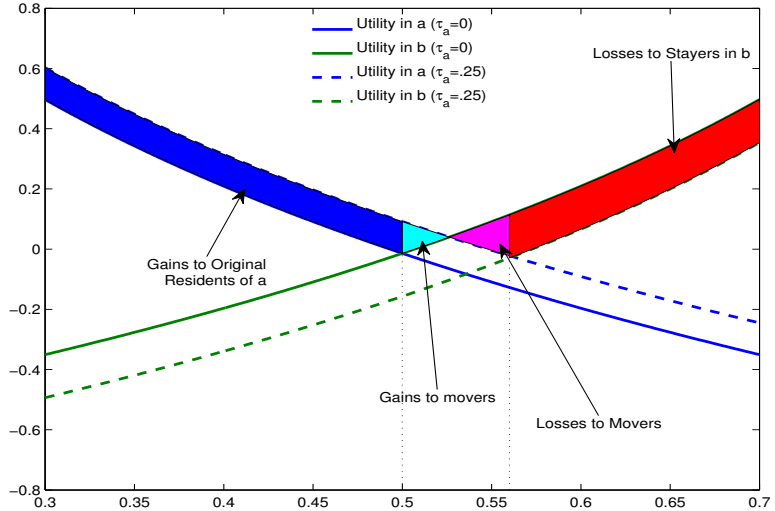
Welfare around Symmetric Equilibrium

Figure 2: Welfare as a Function of City a's Share



Welfare: Gains and Losses

Figure 3: Worker Utility by City



Deadweight Loss of Subsidy

Deadweight loss is proportional to and increasing in $dN_a/d\tau_a$, meaning the larger change in population, the greater the DWL

When workers are completely *im*mobile ($s = \infty$), there is no DWL

KM note that this is a counter-intuitive result: optimal place-based policy causes no movement and creates no new jobs

Can also interpret this conclusion as policies that help a distressed location, while causing little in-migration, result in less DWL

KM note that some "Empowerment Zone" policies require workers to both live and work in the distressed zone, thus limiting DWL (other workers can't commute in, residents can't commute out)

Place-based Policies when Markets are Imperfect

Local Public Goods

Say government spends λ to increase local amenity in city a, A_a, by 1

If workers are completely immobile, then only residents in a are affected. Then the spending is efficient if the aggregate value is larger than the cost

Since utility is quasilinear, increasing A_a by one unit increase utility by 1 for all N_a residents, an aggregate increase of N_a. Thus if $N_a > \lambda$ then spending is efficient

If residents are mobile, then increasing A_a will increase population and housing costs, depending on elasticity

In this case, it's possible that mostly landlords benefit while residents of a are hurt from higher housing costs

However, total welfare (resident utility plus landlord profit) will still rise if $N_a > \lambda$ (even if residents are worse off)

Place-based Policies with Agglomeration

Say there is agglomeration in production, so that productivity depends on density (population)

This can generate multiple equilibria because increases in population lead to further increases in the real wage

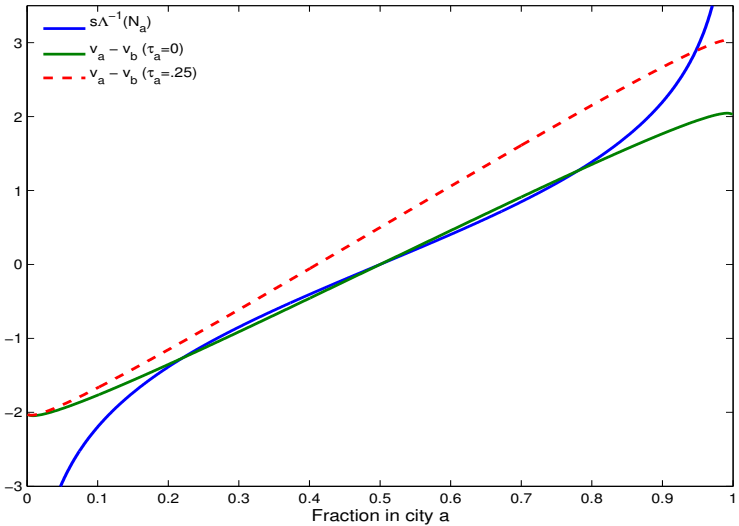
KM note that in this case a place-based policy can be efficient because it allows policy-makers to pick a more productive equilibrium (an equilibrium where firms have higher productivity)

However, authors also discuss difficulties in being able to choose a more productive equilibrium, including not knowing the functional form of agglomeration

Further, equilibria in presence of strong agglomeration are still not efficient since optimal outcome is most of population in a a single place (see Figure 5)

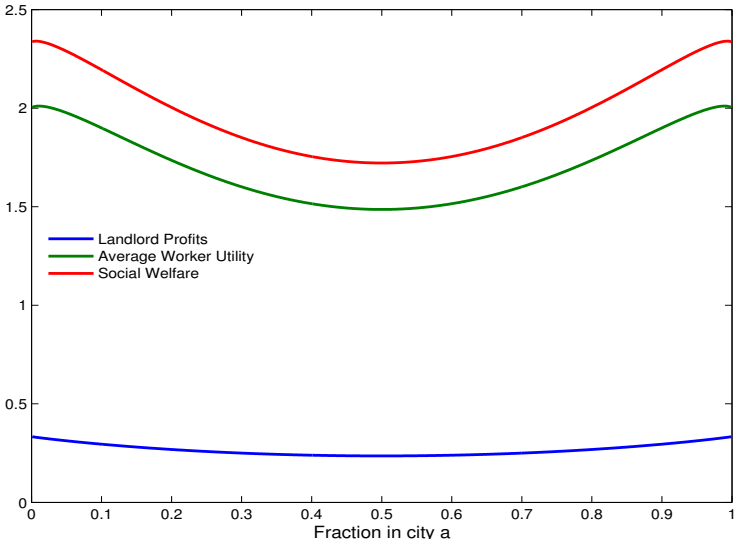
Multiple Equilibria with Agglomeration

Figure 4: Equilibrium with Agglomeration



Welfare with Agglomeration

Figure 5: Welfare with Agglomeration



Agglomeration with Unique Equilibrium

If there is a single equilibrium in the presence of agglomeration, then efficiency depends on whether gain to one city is larger than loss to another

If we subsidize *a*, then workers from *b* will move to *a*, raising productivity in *a* while lowering it in *b*

KM argue that net effect depends on elasticity of productivity with respect to density: if elasticity is constant then gains in *a* are canceled by losses in *b*

Kline and Moretti (QJE 2014) estimate this elasticity in US (data from 1970-200) and find that it's close to constant, suggesting spatial subsidies do not have a positive net effect

Place-based Policies with other Market Imperfections

Here I very briefly summarize, see paper for details

Labor Market Frictions: With labor market frictions (ex: high hiring costs), KM 2013 suggest hiring subsidies can raise efficiency

Basic idea is firms post too few vacancies because probability of finding a match is low. Policy: provide hiring subsidies to firms

Credit Constraints: ex: some workers may not be able to move to more productive area because they can't borrow to pay for the moving costs

Policy: provide moving vouchers to increase mobility

Pre-existing distortions: many policy may distort labor market in order to implement policy goal (ex: union contracts, minimum wages, safety rules, US federal taxation of nominal income)

Place-based policies could be used as a second-best solution to offset some of these distortions

Conclusions

Place-based policies “involve potentially severe equity-efficiency trade-offs”

Policy-makers “should be careful to consider the unintended consequences that can arise from worker (and firm) mobility. Subsidizing poor or unproductive places is an imperfect way of transferring resources to poor people.”

Further, significant portion of subsidies aimed at workers may simply increase housing prices and enrich landlords, thus it “may be advisable to target areas with depressed housing markets and high vacancy rates,” as well as “design subsidies that are difficult to arbitrage via mobility”

Policies intended to create agglomeration externalities (ex: industrial cluster policy) may simply move economic activity from one location to another, with no positive net impact

Place-based policies can be efficient when the government provides a local public good, or uses a policy to offset a pre-existing market distortion

References

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