Location as an Asset

Adrien Bilal, Esteban Rossi-Hansberg

Presented by Melanie Friedrichs

Department of Economics
Stern School of Business, NYU
mf2975@stern.nyu.edu

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Motivation

Idea of location as an asset

- Sjaastand (1962)
- Lucas (2004)
- Morten (2017)
- This paper

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Benefits of thinking of location as an asset:

- Emphasizes that location is a choice made in context, not a static, standalone decision $\rightarrow$ can help explain seemingly inoptmial location decision choices
- Methodological: asset analysis generally more developed in economics

Location as an asset

Basic setup

- There is continuum of locations $z \in [\underline{z}, \bar{z}]$, where $\bar{z}$ is the most productive location. If you choose to move to z in period t, you get $f(z)$ in $t+1 \longleftrightarrow$ There is an asset z that pays return $f(z)$

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Special characteristics of the location asset:

- No borrowing constraint
- Return depends on:
  - Quantity demanded in aggregate (congestion)
  - Individual characteristics; particularly, the authors assume high productivity individuals benefit more from high productivity places (sorting)
  - Quantity demanded by the individual (nonlinear pricing)

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- Adjustment costs

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- Adjustment costs
- Risky returns (possibly idiosyncratic)

Paper contents

1. Two period model
2. Infinite horizon model
3. Testing implications with French tax data
   - More constrained (lower wealth) individuals are more likely to relocate to a worse location after a negative income (unemployment) shock

Two period model

Household problem

$$V(y_0, y_1, s) = \max_{c_0, c_1, a, z} \log c_0 + \beta \log c_1$$

$$\begin{aligned} \text{s.t.} \quad & c_0 + a + q(z) = y_0 \\ & c_1 = zs + y_1 + Ra \\ & a \geq \underline{a} \end{aligned}$$

Market clearing

$q(z) = Q(L(z))$ for $z \in [\underline{z}, \bar{z}]$

$$\int_{\underline{z}}^{z} L(z) H(dz) = \int_{\underline{y}_0}^{\bar{y}_0} \int_{\underline{y}_1}^{\bar{y}_1} \int_{\underline{s}}^{\bar{s}} \mathbf{1}\left[z^*(y_0, y_1, s) \leq z\right] F(dy_0, dy_1, ds)$$

Q strictly increasing

Model solution

From household optimization:

$$R = \frac{s}{q'\left(z^*\left(y_0, y_1, s\right)\right)}$$

Define:

$z^*\left(y_0, y_1, s\right) \equiv \mathcal{Z}^U(s)$ if household is unconstrained, i.e. $y_0 \geq Y_0\left(y_1, s\right)$

$z^*\left(y_0, y_1, s\right) \equiv \mathcal{Z}^C\left(y_0, y_1, s\right) < \mathcal{Z}^U(s)$ if constrained, i.e. $y_0 < Y_0\left(y_1, s\right)$

Equilibrium properties:

- $q(z)$ is increasing and convex
- for $z \geq \hat{z}, q'(z) = \frac{S^U(z)}{R}$
- $\frac{\partial q'(z)}{\partial \bar{R}} < 0$ for $z \geq \hat{z}$ if $\bar{s} - \underline{s}$ is sufficiently small

Equilibrium properties

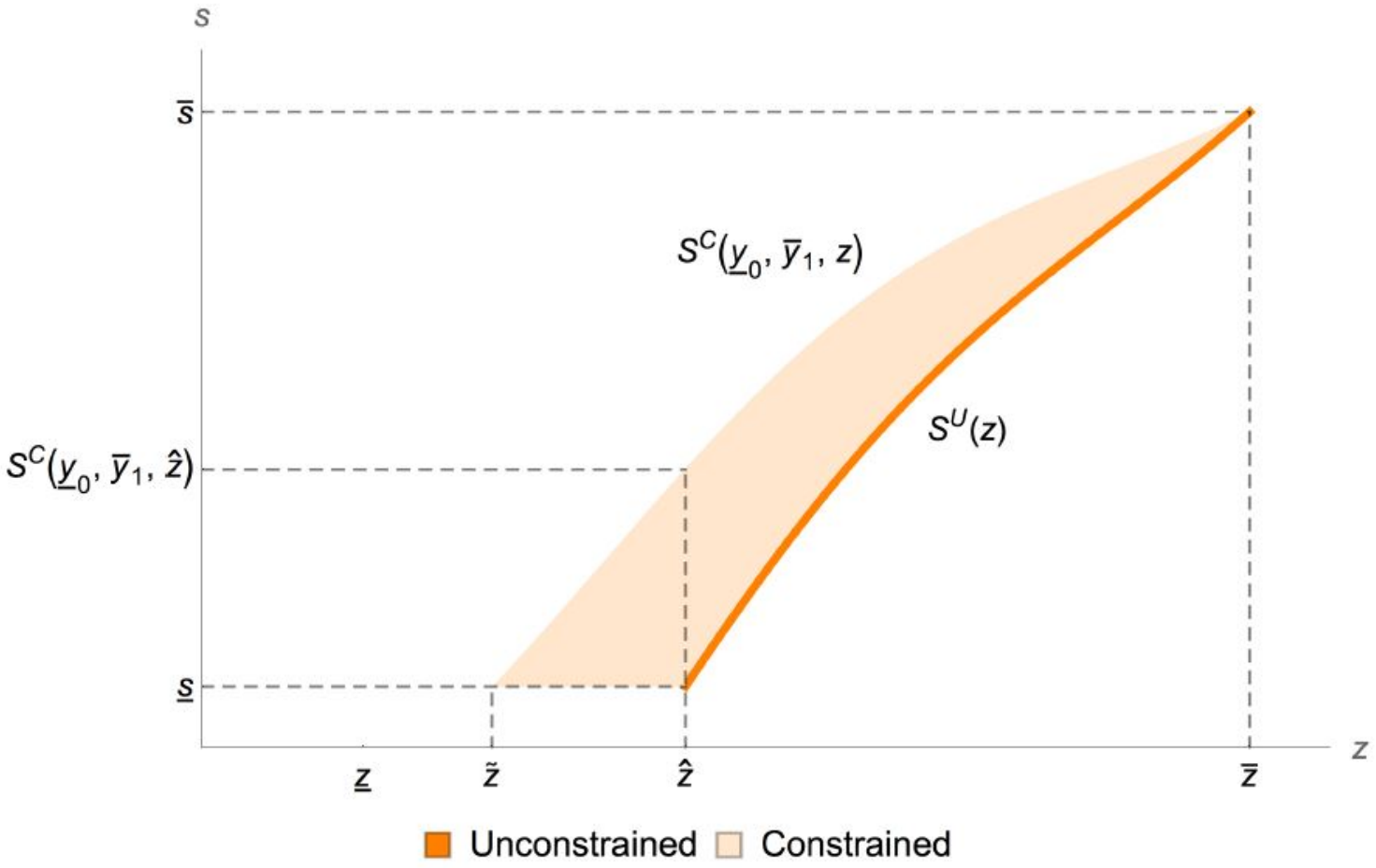
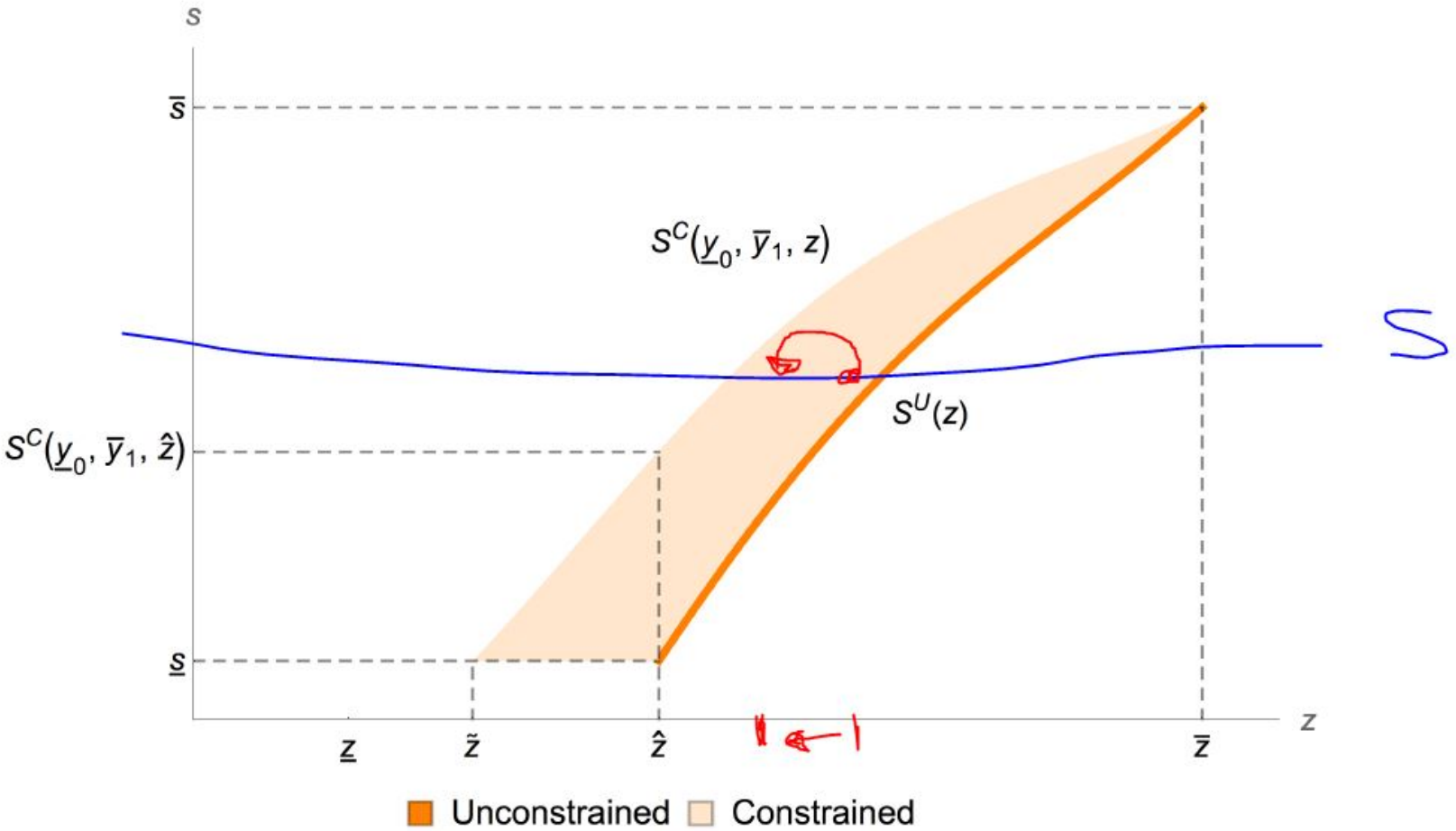


Figure 1: Allocation of skills to cities

Response to negative income shock



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Equilibrium properties

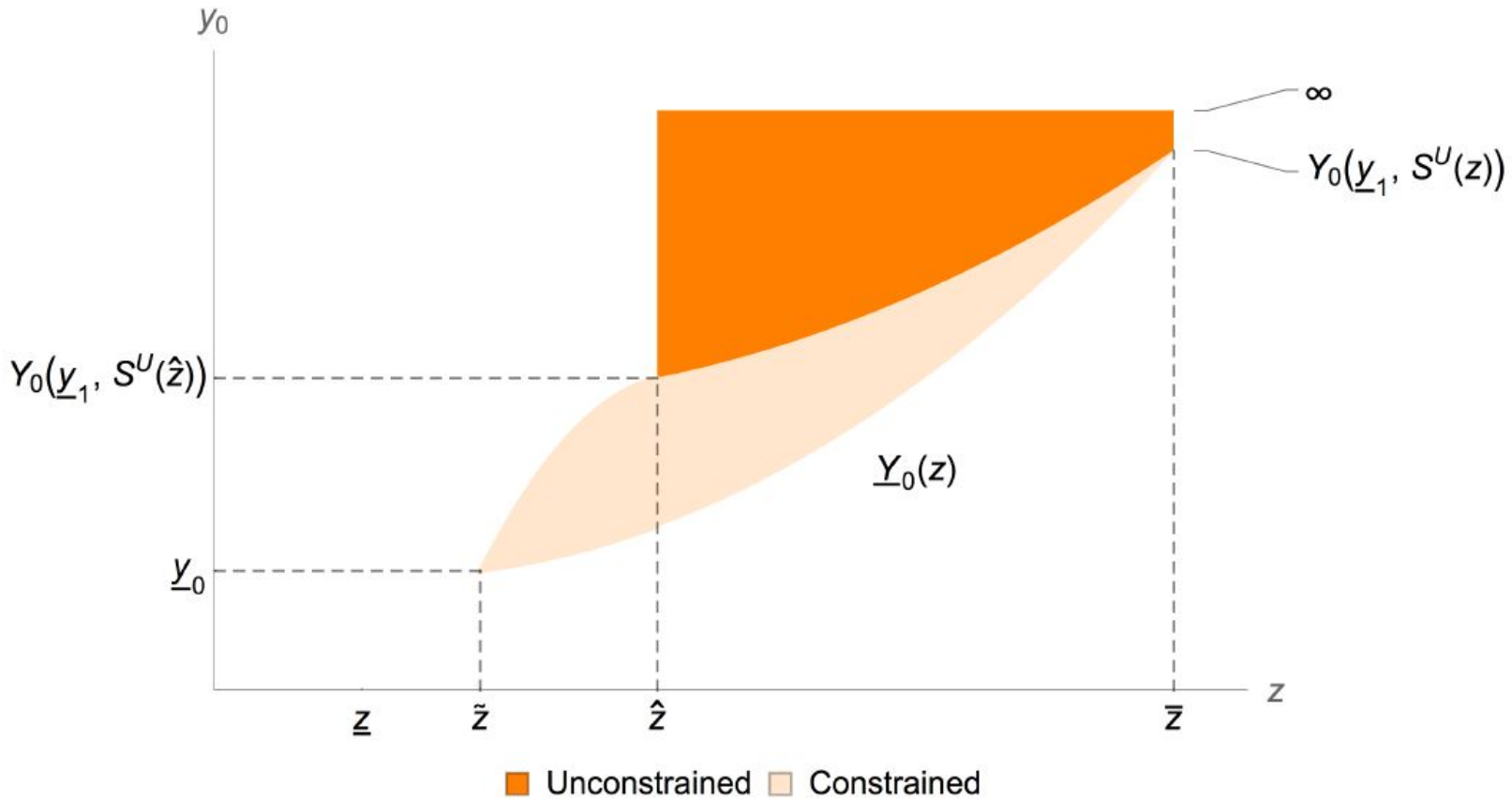


Figure 2: Allocation of income groups to cities

Equilibrium properties

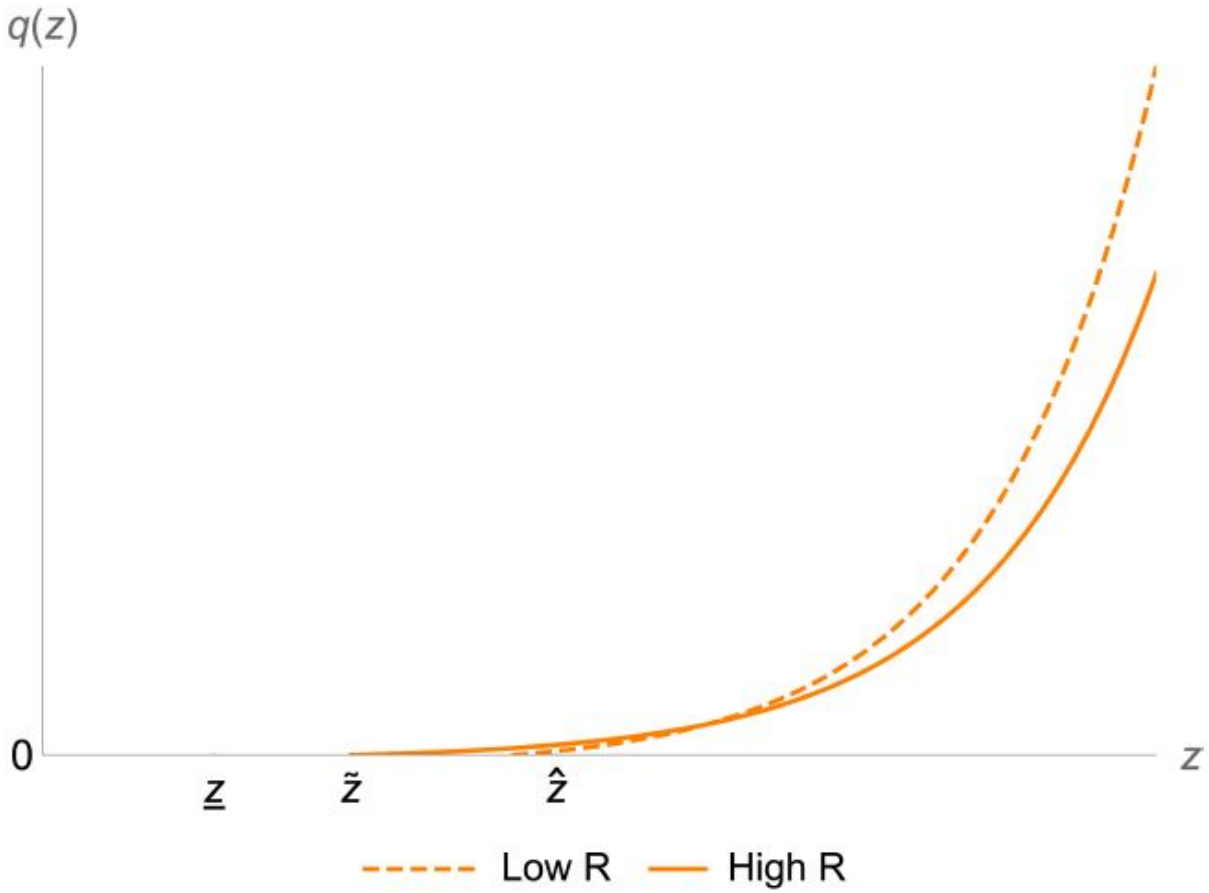


Figure 3: House rents across cities

Policy analysis

First best allocation

- An unconstrained planner will put every household of type s in location $\mathcal{Z}^U(s)$
- There is less output and less output net of housing costs in the decentralized equilibrium

Place based policy: $[\underline{z}, \bar{z}] \rightarrow z_0$

- All unconstrained agents with $s \in \left[\underline{s}, S^U(E[z])\right]$ are worse off
- All constrained agents (y_0, y_1, s) with $s \in \left[\underline{s}, S^C\left(y_0, y_1, E[z]\right)\right]$ are worse off
- Since $S^C\left(y_0, y_1, E[z]\right) > S^U(E[z])$, the set of skills of constrained individuals that are worse off is larger

Infinite horizon model

Household problem

$$V\left(a_t, z_t, y_t, s\right) = \max_{\left\{a_{t+1}, z_{t+1}\right\}_{t-0}} E_0\left[\sum_{t=0}^{\infty} \beta^t u\left(c_t\right)\right]$$

$$\text{s.t.} \quad c_t + a_{t+1} + q\left(z_{t+1}\right) = y_t + s z_t + R a_t$$

$$a_{t+1} \geq \underline{a}$$

Market clearing

$q(z) = Q(L(z))$ for $z \in [\underline{z}, \bar{z}]$

$$\int_{\underline{z}}^{z} L_\tau(z) H(dz) = \sum_{i=1}^{N} \int_{\underline{a}}^{\infty} \int_{\underline{z}}^{\bar{z}} \int_{\underline{s}}^{\bar{s}} 1\left[z^*\left(a, z, y_i, s\right) \leq z\right] F_t(da, dz, ds)$$

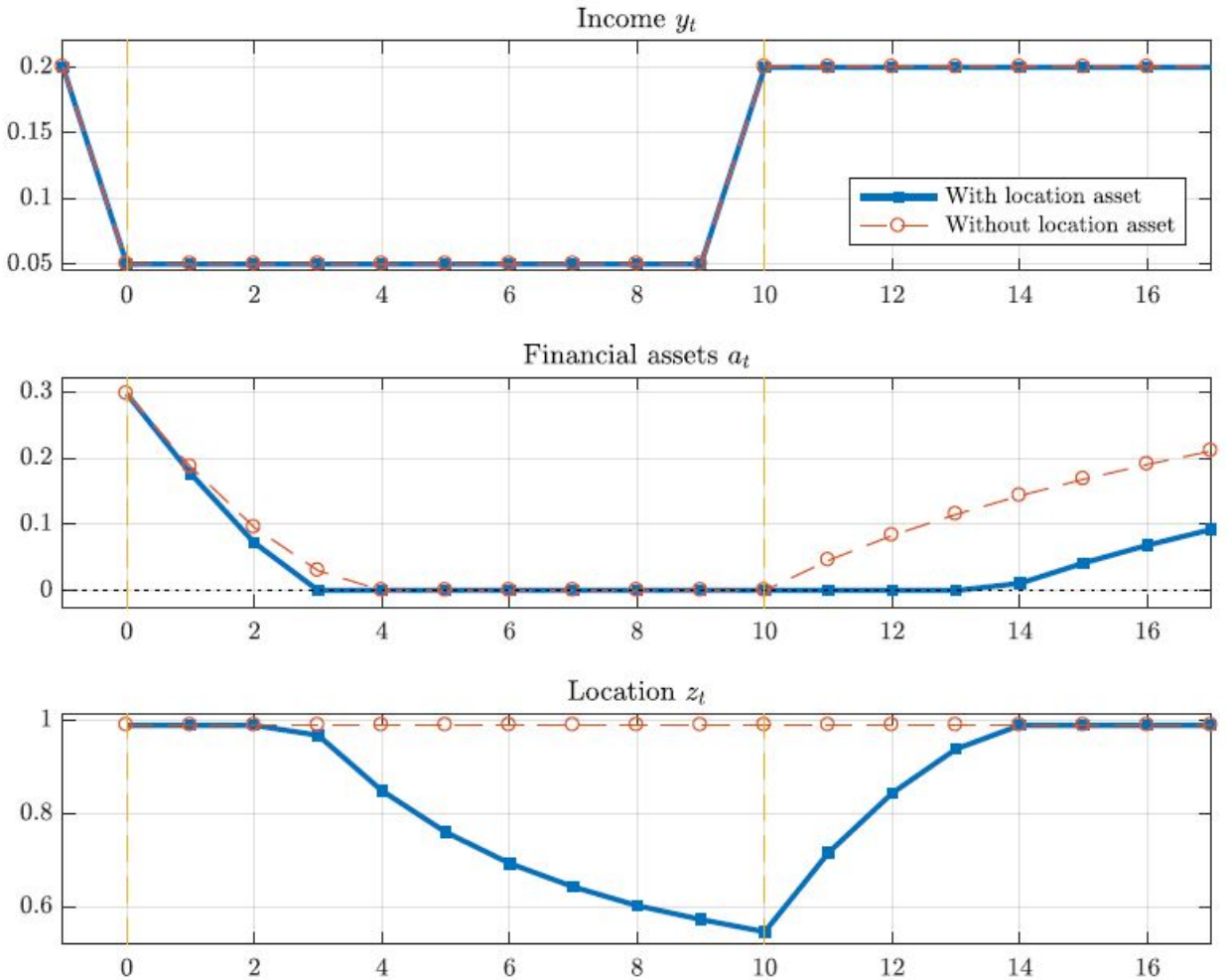
Q strictly increasing

Calibration

Table 7: Calibration Parameters

Parameter	Notation	Value
Preferences		
Discount Factor	β	0.95
Intertemporal Elasticity of Substitution	σ	0.2
Idiosyncratic Income		
Skill	s	0.5
Low Income State	y_1	0.05
High Income State	y_2	0.2
Transition Probability From Low to High	Λ_{12}	0.6
Transition Probability From High to Low	Λ_{21}	0.1
Financial Markets		
Risk-Free Rate	R	1.03
Credit Constraint	$\underline{a}$	0.00
Cities		
Best City	$\overline{z}$	1.00
Worst City	$\underline{z}$	0.00
House Rents Slope	$q'(z)$	$0.18 + 0.44 \cdot z^{1.05}$
House Rents	$q(z)$	$\int_{\underline{z}}^{z} q'(x)dx$

Impulse response to negative income shock



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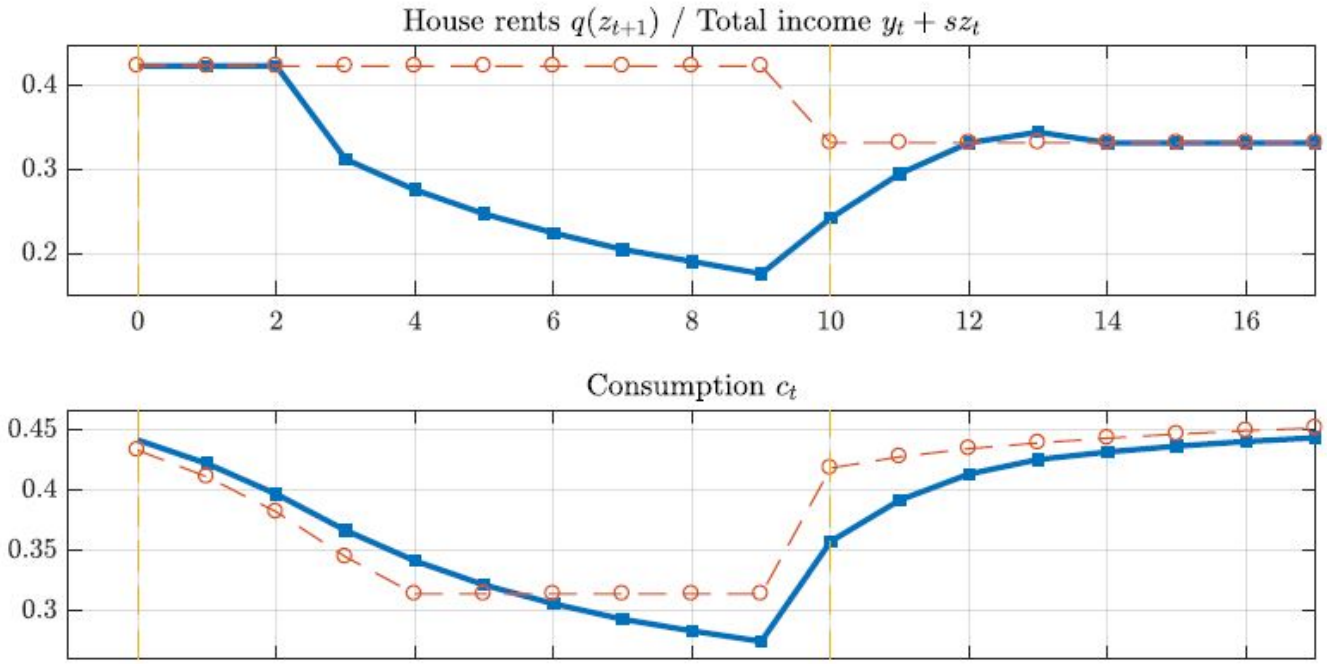

Figure 4: Dynamic reaction to a temporary income shock

Consumption & welfare gains from location asset

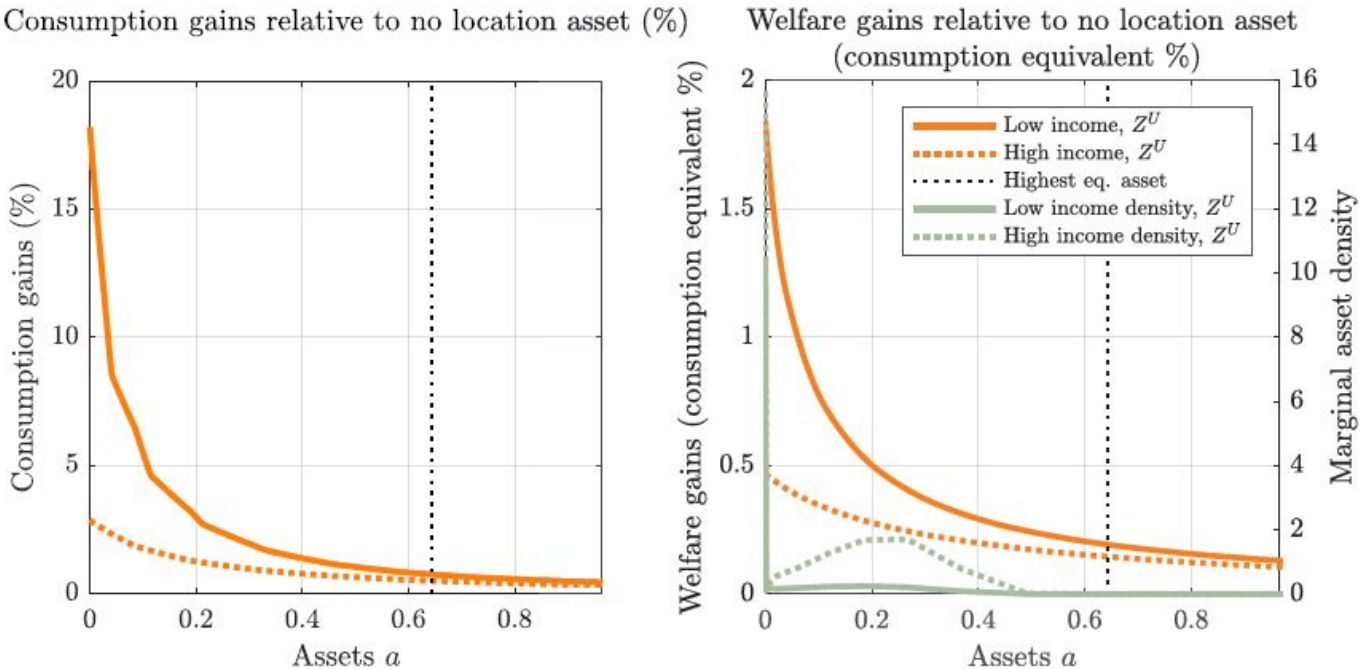

Figure 5: Consumption and welfare gains from the use of the Location Asset

Data

Data

- Two administrative tax datasets:
  - DADS panel → annual, about 4% of all French workers, can track individuals across locations
  - Postes → details on employers, unemployment spells

Variables

- Negative income shock: individuals who were employed for at least 40 days, employed for at least 90 days on other side
- Constrained:
  - Wage percentile at start location
  - Local assets constructed with perpetual inventory method

Better locations do offer better wages

$$\log \frac{w_{it}}{w_{i,-1}} = \alpha_{it} + \gamma_t \log w_{i,-1} + \beta_t P(z_{i0}) + z_{it}$$

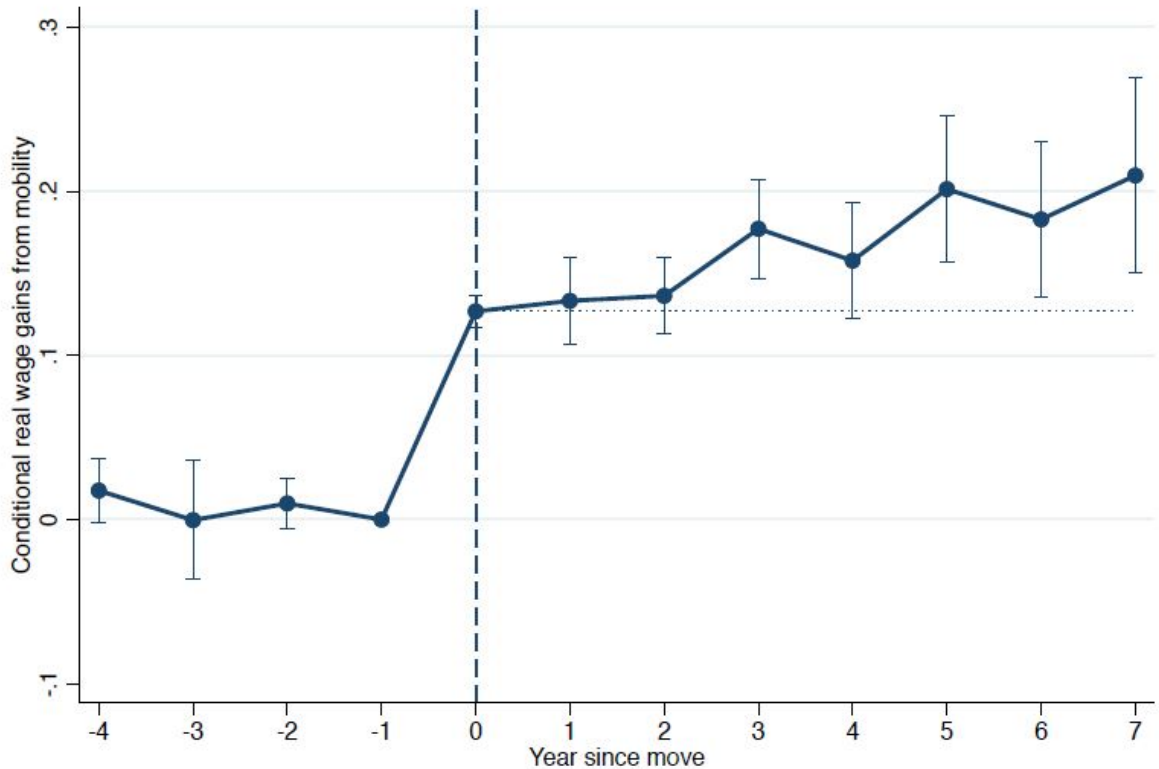

Figure 6: Plot of the $\beta_t - \beta_{-1}$ coefficients, for $t = -4...7$, and observed daily real wages. $t = 0$ is the first move of a worker and is the instantaneous effect of location. Standard errors clustered at the origin municipality level. Using the 4% long panel. The dots show the point estimate, and vertical bars are the 90% confidence intervals.

Less wealthy downgrade location more after job loss

$$P\left(z_{1it}\right) - P\left(z_{0it}\right) = \alpha_{z_0} + \alpha_t + \alpha_I + \beta_w P\left(w_{it}; z_{0it}\right) + \beta_X \mathbf{X}_{it} + \varepsilon_{it}$$

Table 1: Unemployment spells and location decisions

Movers only. Fixed city ranks.

Origin Wage Perc. (OWP)	0.100***	0.100***	0.119***	0.148***	0.354***	0.345***	0.343***	0.341***	0.730***
	(0.005)	(0.005)	(0.004)	(0.006)	(0.018)	(0.018)	(0.018)	(0.018)	(0.051)
Controls									
Pre-Move Log Wage					-0.084***	-0.087***	-0.087***	-0.088***	-0.083***
					(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Post-Move Log Wage						0.023***	0.022***	0.020***	0.024***
						(0.002)	(0.002)	(0.002)	(0.002)
Post-Move Log Comm. Dist.							0.010***	0.001	0.001
							(0.001)	(0.001)	(0.001)
Post-Move Amenities Perc. (First PC, other 4 unrep.)								0.290***	0.289***
								(0.013)	(0.013)
OWP * W0									-0.094***
									(0.010)
Constant	-0.044***								
	(0.009)								
Fixed effects									
Origin Département & Year		✓	✓	✓	✓	✓	✓	✓	✓
Age, Birthplace & Gender			✓	✓	✓	✓	✓	✓	✓
2-Digit Origin Occ. & Ind.				✓	✓	✓	✓	✓	✓
Obs.	292489	292489	292431	292428	292428	292428	270351	269914	269914
R^2	0.008	0.060	0.072	0.075	0.088	0.090	0.093	0.154	0.157
W.-R^2		0.008	0.009	0.010	0.024	0.026	0.029	0.095	0.098

22,180 Origin Municipalities; 2002-2007. Standard errors in parenthesis.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. SEs clustered at the department level.

Effect of OWP at median W0 in last column = 0.730 - 0.094 * 3.512 = 0.400. At P10 = 0.496. At P90 = 0.334

Less wealthy downgrade location more after job loss

within municipality

Table 2: Unemployment spells and location decisions within municipalities

Movers only. Fixed city ranks.

Origin Wage Perc. (OWP)	0.100***	0.063***	0.066***	0.035***	0.044***	0.026***	0.022***	0.019***
	(0.005)	(0.003)	(0.003)	(0.003)	(0.004)	(0.005)	(0.005)	(0.004)
Controls								
Pre-Move Log Wage					-0.003*	-0.007***	-0.006***	-0.007***
					(0.001)	(0.001)	(0.001)	(0.001)
Post-Move Log Wage						0.034***	0.033***	0.032***
						(0.002)	(0.002)	(0.002)
Post-Move Log Comm. Dist.							0.008***	-0.001
							(0.001)	(0.001)
Post-Move Amenities Perc. (First PC, other 4 unrep.)								0.308***
								(0.012)
Constant	-0.044***							
	(0.009)							
Fixed effects								
Origin Municipality & Year		✓	✓	✓	✓	✓	✓	✓
Age, Birthplace & Gender			✓	✓	✓	✓	✓	✓
2-Digit Origin Occ. & Ind.				✓	✓	✓	✓	✓
Obs.	292489	287453	287394	287391	287391	287391	265056	264604
R^2	0.008	0.455	0.463	0.466	0.466	0.470	0.474	0.530
W.-R^2		0.005	0.005	0.001	0.001	0.009	0.012	0.117

22,180 Origin Municipalities; 2002-2007. Standard errors in parenthesis.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. SEs clustered at the department level.

Less wealthy downgrade location more after job loss

with imputed local asset percentile measure instead of income percentile

Table 4: Unemployment spells and location decisions using Local Asset Percentile measure: OLS

Movers only. Fixed city rank. Forecasting method.

Origin Asset Perc. (OAP)	0.077***	0.067***	0.071***	0.073***	0.090***	0.084***	0.084***	0.080***
	(0.004)	(0.003)	(0.005)	(0.006)	(0.007)	(0.007)	(0.007)	(0.008)
Controls								
Pre-Move Log Wage					-0.014***	-0.019***	-0.019***	-0.020***
					(0.002)	(0.002)	(0.002)	(0.002)
Post-Move Log Wage						0.027***	0.026***	0.024***
						(0.002)	(0.002)	(0.002)
Post-Move Log Comm. Dist.							0.011***	0.001
							(0.001)	(0.001)
Post-Move Amenities Perc. (First PC, other 4 unrep.)								0.289***
								(0.013)
Constant	-0.041***							
	(0.012)							
Fixed Effects								
Origin Département & Year		✓	✓	✓	✓	✓	✓	✓
Age, Birthplace & Gender			✓	✓	✓	✓	✓	✓
2-Digit Origin Occ. & Ind.				✓	✓	✓	✓	✓
Obs.	292489	292489	292431	292428	292428	292428	270351	269914
R^2	0.004	0.055	0.066	0.068	0.069	0.072	0.075	0.136
W.-R^2		0.003	0.003	0.003	0.004	0.007	0.010	0.075

22,180 Origin Municipalities; 2002-2007. Standard errors in parenthesis.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. SEs clustered at the department level.

Movement of unemployed vs job switchers

Table 3: Location decisions of unemployed (1 year +) relative to job switchers

Movers only. EUE transitions (1 year +) relative to EE transitions. Fixed City Rank.

1[Long EUE] * OWP	0.020***	0.054***	0.065***	0.064***	0.035*
	(0.005)	(0.013)	(0.014)	(0.015)	(0.016)
OWP	0.136***	0.311***	0.291***	0.291***	0.316***
	(0.008)	(0.021)	(0.020)	(0.020)	(0.021)
Controls					
Pre-Move Log Wage (W0)		-0.080***	-0.074***	-0.075***	-0.085***
		(0.005)	(0.005)	(0.005)	(0.006)
1[Long EUE] * W0		-0.006**	-0.016***	-0.014**	-0.006
		(0.002)	(0.005)	(0.005)	(0.005)
Post-Move Log Wage (W1)			0.019***	0.017***	0.012**
			(0.004)	(0.004)	(0.004)
1[Long EUE] * W1			0.007*	0.008*	0.013***
			(0.004)	(0.004)	(0.004)
Post-Move Log Comm. Dist. (C1)				0.012***	0.002
				(0.003)	(0.002)
1[Long EUE] * C1				-0.003	-0.002
				(0.002)	(0.002)
Post-Move Amenities Percentile (A1, First PC, other 4 unreported)					0.322***
					(0.017)
1[Long EUE] * A1 (other 4 interactions unreported)					-0.041**
					(0.012)
Fixed Effects					
Origin Département & Year	✓	✓	✓	✓	✓
Age, Birthplace & Gender	✓	✓	✓	✓	✓
2-Digit Origin Occupation & Industry	✓	✓	✓	✓	✓
Obs.	204037	204037	204037	188111	187801
R^2	0.075	0.088	0.091	0.093	0.153
W.-R^2	0.011	0.025	0.028	0.031	0.095

22,180 Origin Municipalities; 2002-2007. Standard errors in parenthesis
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. SEs clustered at the département level.

Unemployed move more (less if unconstrained) (less if constrained & city on the decline)

$$1[Move_{it}] = \alpha_{z_0} + \alpha_t + \alpha_I + \beta_w P(w_{it}; z_{0it}) + \beta_\Delta \Delta_{z_0 t} + \beta_{\Delta,P} \Delta_{z_0 t} \cdot P(w_{it}; z_{0it}) + \beta_X \mathbf{X}_{it} + 1[\text{ Long EUE}_{it}] \cdot \left[\beta_{\text{EUE},w} P(w_{it}; z_{0it}) + \beta_{\text{EUE},\Delta} \Delta_{z_0 t} + \beta_{\text{EUE},w,\Delta} P(w_{it}; z_{0it}) \Delta_{z_0 t}\right]$$

Table 6: Mobility decisions of unemployed (1 year +) relative to job switchers.

Movers and stayers. EUE transitions (1 year +) relative to EE transitions.

Level Effects				
Origin Wage Perc. (OWP)	0.138***	0.114***	0.112***	0.113***
	(0.004)	(0.006)	(0.006)	(0.006)
Local Employment Growth (Δ)	0.126**	0.116**	0.148**	0.119*
	(0.040)	(0.040)	(0.052)	(0.058)
1[Long EUE]	0.056***	0.052***	0.067***	0.096***
	(0.008)	(0.008)	(0.007)	(0.012)
Double Interactions				
1[Long EUE] * OWP	-0.043***	-0.032**	-0.031**	-0.041***
	(0.010)	(0.010)	(0.010)	(0.009)
Δ * OWP	0.092*	0.110*	0.118*	0.106*
	(0.045)	(0.044)	(0.048)	(0.041)
1[Long EUE] * Δ	0.002	0.019	0.052	0.029
	(0.062)	(0.059)	(0.068)	(0.076)
Triple Interaction				
1[Long EUE] * Δ * OWP	-0.198+	-0.205+	-0.226*	-0.194+
	(0.105)	(0.104)	(0.110)	(0.108)

Conclusion

Idea of "Location as an Asset"

- Useful idea
- Some thoughts about what particularly makes the location asset special, but this could probably be expanded

Empirical work:

- New fact: lower wealth individuals move more after unemployment