Should Cities Diversify? City Risk and Industrial Policy

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"[W]hatever policies the next mayor pursues, the crucial idea is that putting a city back on its feet economically requires more than aiding existing businesses. It requires creating the conditions for new ones to open and expand, further **diversifying** *the economy."*

Michael Bloomberg, NYT, June 2021

"[A] diversified industry base that can help the region withstand a downturn in any one key industry while providing multiple opportunities across sectors for innovation-based growth and investment."

EY report commissioned by the Greater Austin Economic Development Corporation

Broad (vague?) idea:

Policy intervention to diversify a city's industrial base enhances its ability to absorb industry-specific shocks.

i.e. Large variations of city's output are harmful.

But

- Why would output volatility create welfare losses?
- Even if it does, is policy intervention desirable?

What we do

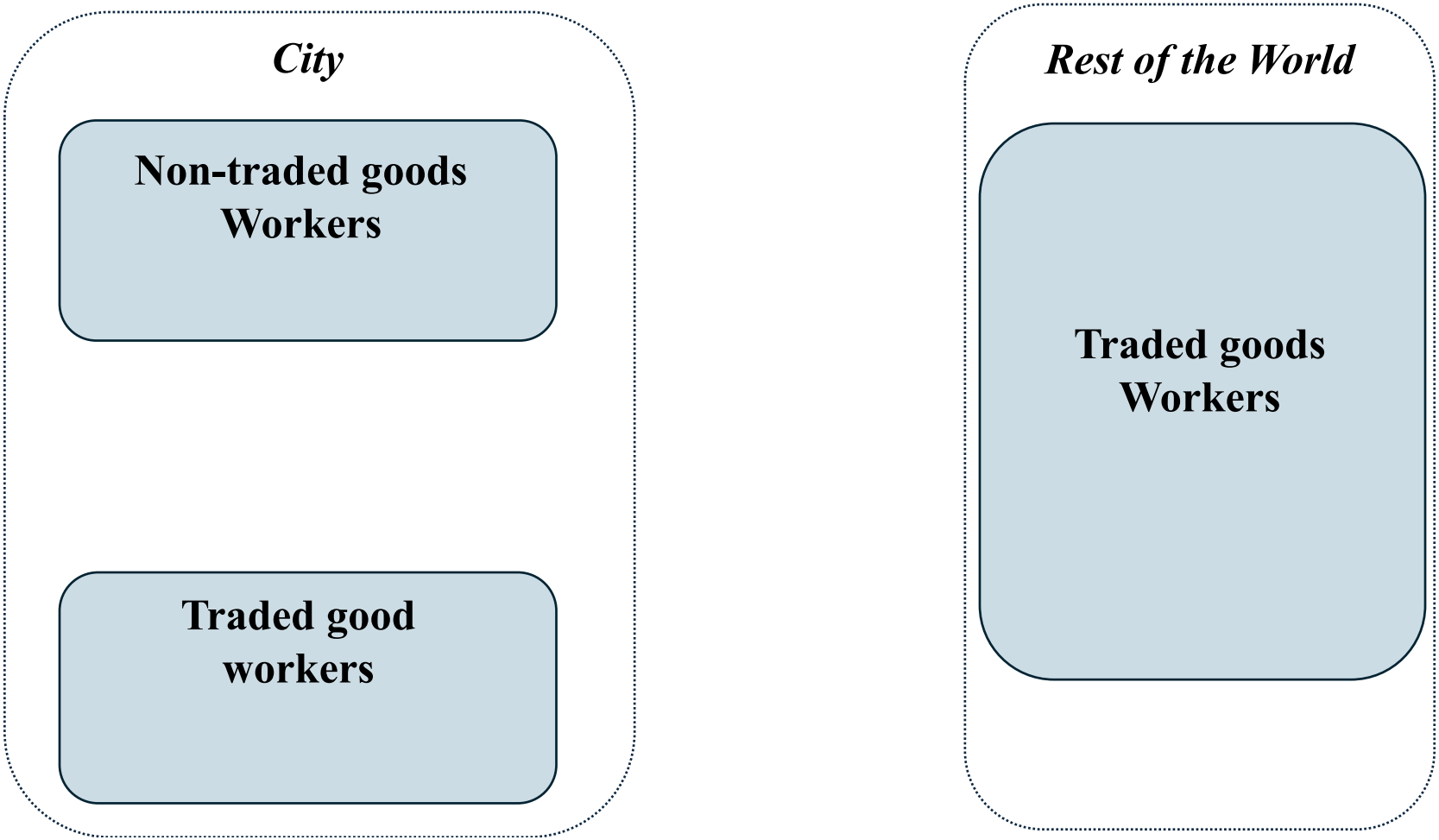
We build a stylized model of city **risk** where

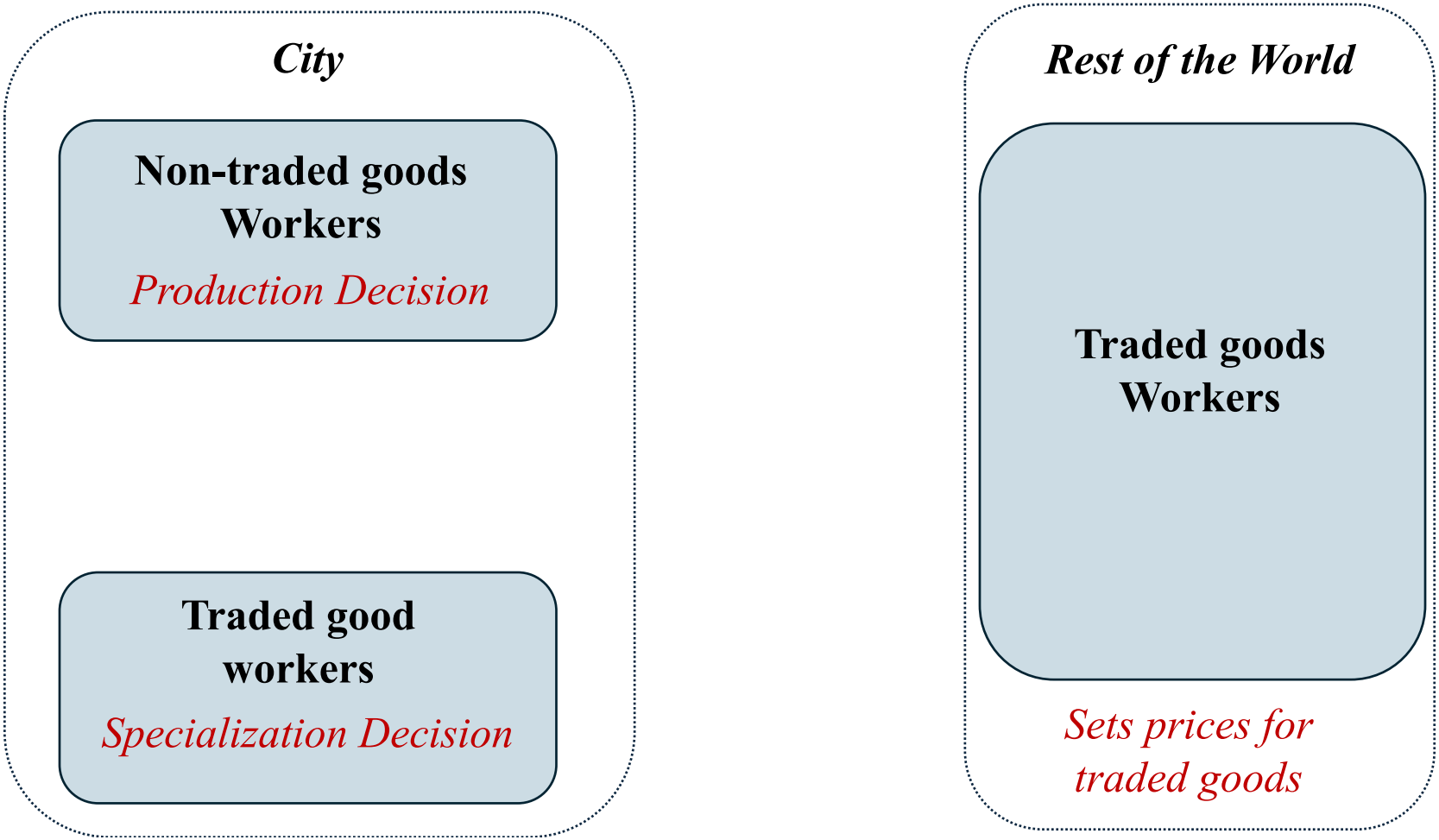
- the level of diversification in the production of *traded goods* is endogenous,
- there exists a non-traded goods' sector subject to a *coordination problem*,

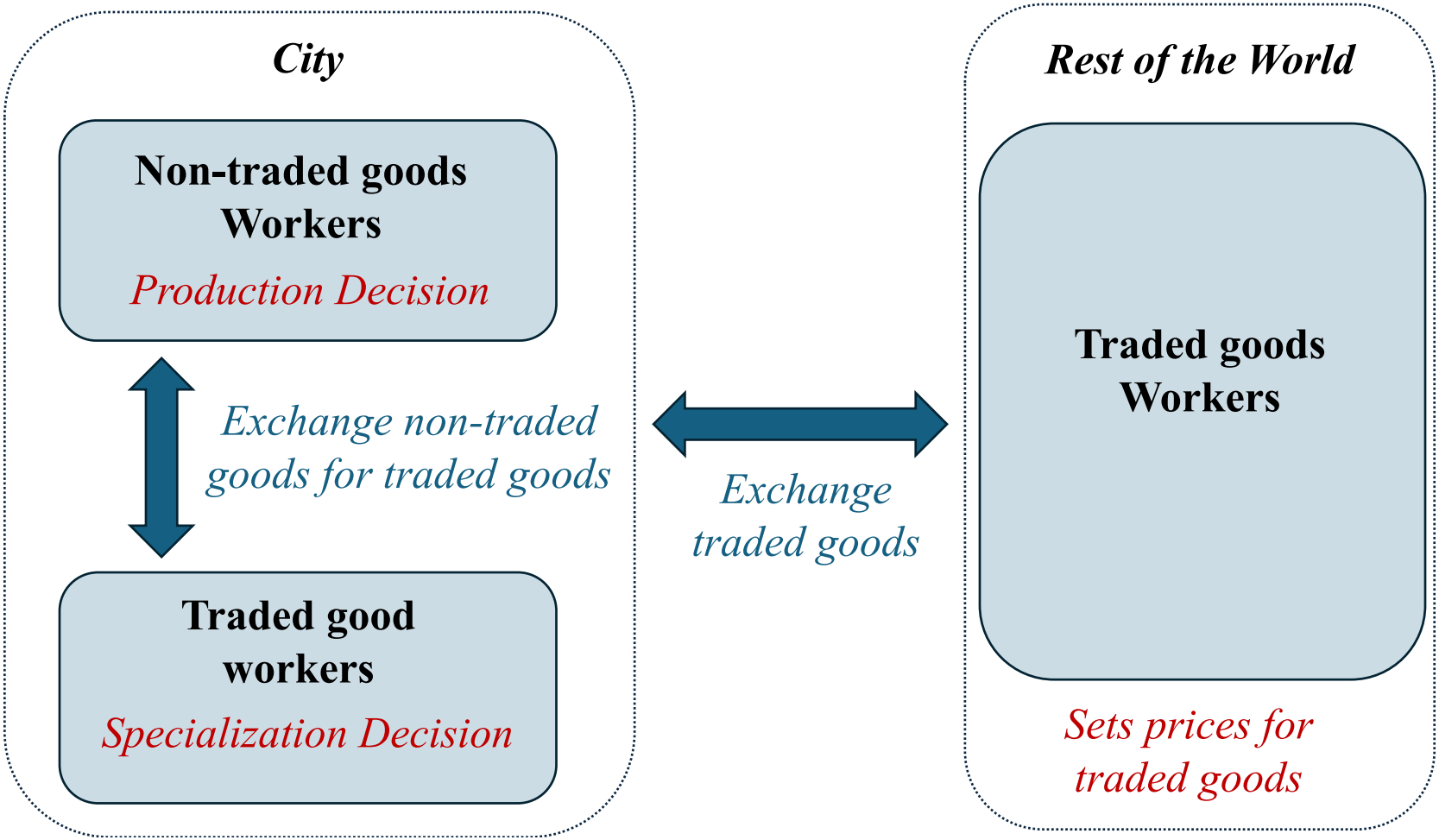
We find that the equilibrium level of industrial diversification is constrained *inefficient*:

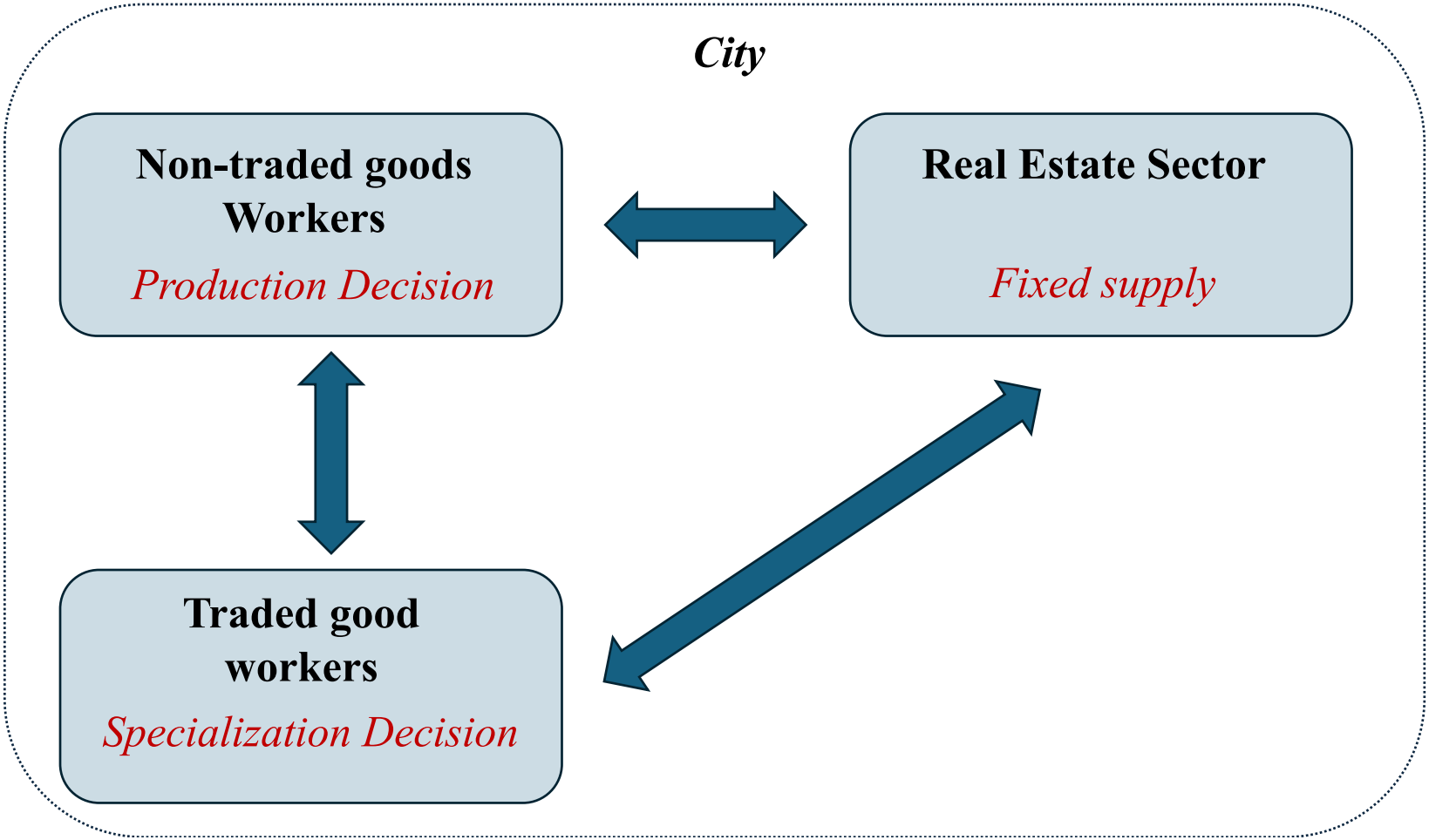
- more productive cities are insufficiently diversified,
- less productive cities are insufficiently focused.

$\Rightarrow$ Rationale for industrial policy.


City
Non-traded goods Workers
Traded good workers
Rest of the World
Traded goods Workers


City
Non-traded goods Workers
Production Decision
Traded good workers
Specialization Decision
Rest of the World
Traded goods Workers
Sets prices for traded goods


City
Non-traded goods Workers
Production Decision
Exchange non-traded goods for traded goods
Traded good workers
Specialization Decision
Exchange traded goods
Rest of the World
Traded goods Workers
Sets prices for traded goods


City
Non-traded goods Workers
Production Decision
Real Estate Sector
Fixed supply
Traded good workers
Specialization Decision

Traded goods

- Mass 1 of traded goods (sectors) indexed by $x_t \in [0, 1]$.
- Mass $\overline{L}$ of traded good workers in the city,
  - supply one unit of labour inelastically,
  - choose one traded sector (among finite subset) at $t = 0$
- One unit of labour produces
  - δ unit of traded good $x_t \neq 1$,
  - $\alpha + \delta$ units of traded good 1 $\Rightarrow$ comparative advantage
- Price of traded goods is i.i.d. uniform in $[0, 2]$, set at $t = 1$.

  $\Rightarrow$ Price of basket of traded goods is 1, taken as numeraire.

  $\Rightarrow$ **Value of city traded-good output depends (through sector choices) of prices set outside of the city.**

  $\rightarrow$ only source of (non-strategic) uncertainty in the model.

Non-traded goods

- Mass 1 of non-traded goods indexed by $x_{nt} \in [0, 1]$ in the city.
- At $t = 1$, in each non-traded good sector,
  - one worker produces a fixed quantity $q_0/2$,
  - one worker produces a fixed quantity $q_0/2$ and can produce an extra q_1 at non-pecuniary cost c.
- Prices are set **within** the city.
- Real estate is a specific non-traded good present in fixed supply R.

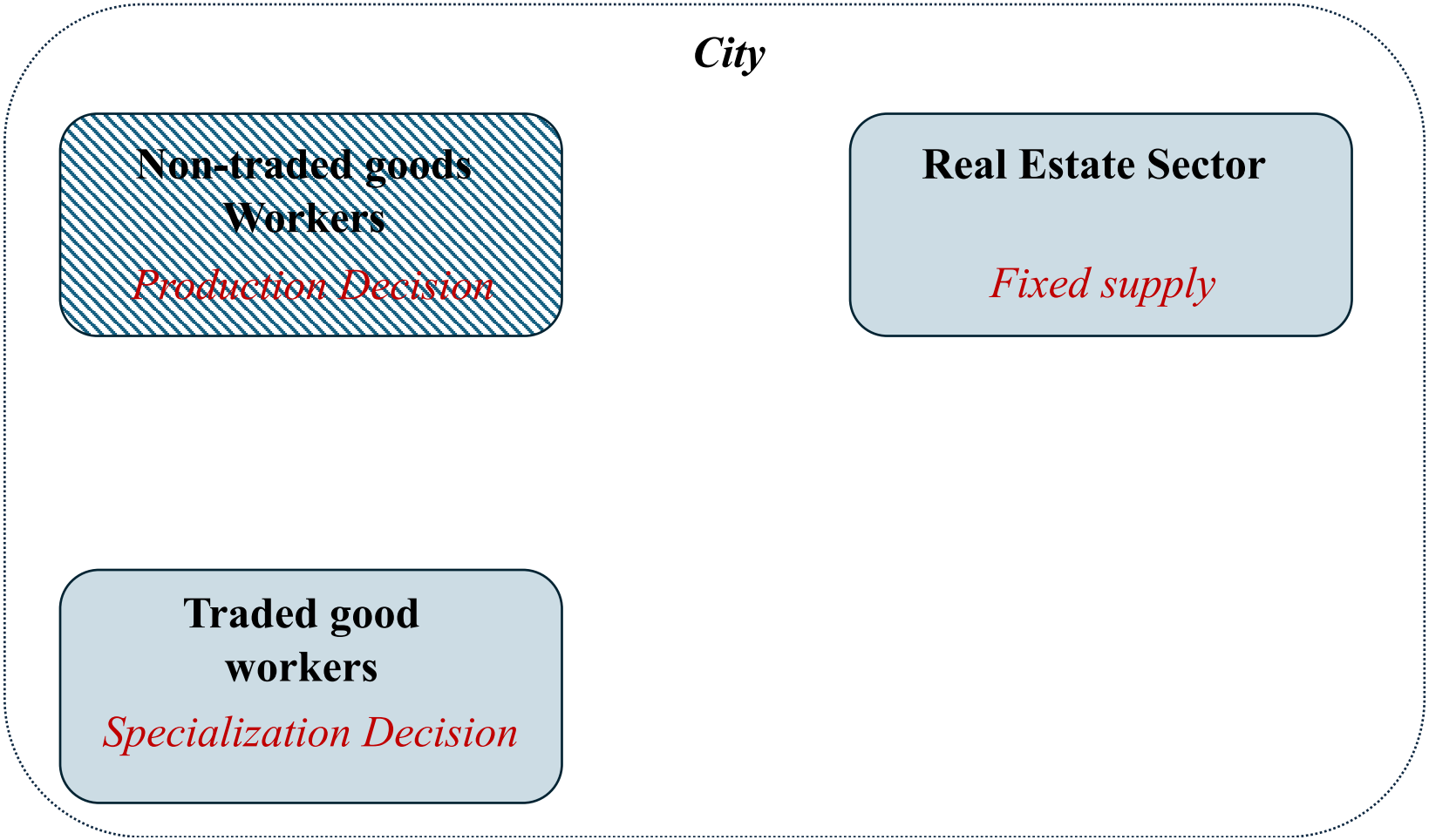
Consumers

All workers

- consume traded and non-traded goods,
- **are risk-neutral** with utility

$$\exp\left[\int_0^1 \gamma_t \ln c_{i,t}(x_t)dx_t + \int_0^1 \gamma_{nt} \ln c_{i,nt}(x_{nt})dx_{nt} + \gamma_r \ln c_{i,r}\right]$$

- cannot hedge city aggregate risk (and have no incentive to share risk within the city).


City
Non-traded goods Workers
Production Decision
Real Estate Sector
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Traded good workers
Specialization Decision

Real estate as the only non-traded good

Proposition

There exists $\overline{\alpha} > 0$, such that

1. if $\alpha \geq \overline{\alpha}$, the city fully specializes in sector 1,
2. if $\alpha < \overline{\alpha}$, the city diversifies across sectors available in the city.

The equilibrium level of diversification is constrained optimal.

Diversification in equilibrium despite risk-neutrality?

- Prices of real estate co-move with profitability of dominant sector

$\Rightarrow$ Motive from transferring income to states where the dominant sector is not doing to well.

Coordination motives in the non-traded good sector

- Traded goods' production decisions are strategic complement:
  - Suppose the production of some non-traded goods go up

  $\Rightarrow$ their prices go down (everything else equal).

  $\Rightarrow$ Incentive for producers of other non-traded goods to increase their income by capturing a larger market share goes up.

  $\Rightarrow$ Production of other traded goods goes up.

$\Rightarrow$ Equilibrium multiplicity treated through a global games approach

Method: infinitesimal amount of dispersed information (Carlsson and Van Damme (1993)).

Coordination motives in the non-traded good sector

Y_t is the city income from producing *traded goods*.

Proposition

There exists a threshold Y_t^T such that

- If $Y_t \geq Y_t^T$ production in non-traded good sectors is $q_0 + q_1$
- If $Y_t < Y_t^T$ production in non-traded good sectors is q_0

At the threshold Y_t^T, welfare is strictly higher if production of non-traded goods is higher (city is "vibrant")

- Threshold-type equilibrium: high production of non-traded goods more likely when the city "fundamentals" are stronger **i.e., when income from traded goods' workers is higher.**
- **Coordination failures**

Inefficient diversification

Suppose only 2 traded-good sectors are available in the city, 1 and x_t with labour shares $L(1)$ and $L(x_t)$.

Proposition

- If α is small enough, there exists an interior equilibrium such that $L(1)^* > L(x_t)^* > 0$.
- In that equilibrium, if $Y_t^T < \delta \overline{L}$, the social planner can increase welfare by decreasing $L(1)$, and if $Y_t^T > \delta \overline{L}$, the social planner can increase welfare by increasing $L(1)$.

Intuition:

- For more productive cities, increasing the volatility of traded good income increases the probability of a coordination failure in the non-traded good sector.
- The opposite holds when the city is less productive.

Literature

- Diversification/focus of cities based on spillovers or economies of scope: Henderson (1974), Abdel-Rahman and Fujita (1990), Abdel-Rahman (1990) and Abdel-Rahman and Fujita (1993).
- Diversification/focus of cities based on risk-sharing within the city/country: Acemoglu and Zilibotti (1997)
- Coordination problems in production, global games: Kiyotaki (1988), Cooper and John (1988), Morris and Shin (2001)

Conclusion

- We build a model where city industry diversification is suboptimal
- The inefficiency is related to a coordination problem in the non-traded good sector
- The model can rationalize industrial policies aiming at increasing focus or diversification of the city's industrial base.