

“Paul Krugman: His Contributions to Trade and Economic Geography”
AAEA Annual Meetings
Milwaukee, WI. July 28th, 2009

Increasing Returns and Economic Geography

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- The Royal Swedish Academy of Sciences decided to award The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2008 to

Paul Krugman
Princeton University, NJ, USA

"for his analysis of trade patterns and location of economic activity"



Introduction

- Krugman (1991, *JPE*) is the seminal paper of what is known as the New Economic Geography (NEG).
- This paper explains why, how, and when the economic activity may be agglomerated in a few places.
- It is a full-fledged general equilibrium and a core-periphery model.
- From Krugman (1991) two other remarkable papers arose:
 1. Krugman & Venables (1995, *QJE*) explains development disparities across space.
 2. Krugman & Livas (1996, *JDE*) explains the impact of international trade cost on cities' size.



Intellectual Background

- NEG roots.
 1. Urban Economics explains (i) How land is distributed among factories, roads, schools. (ii) Why cities have district centers. Alonso (1964) and Mills (1967).
 2. Location Theory explains spatial distribution of firms and spatial variations of prices and costs. Hotelling (1929).
 3. Regional Science is divided into (i) Central Place Theory. (ii) Base-Multiplier Analysis. (iii) Market Potential Analysis. von Thünen (1929).
- Alternative explanations of economic agglomeration are:
 1. Comparative Advantages.
 2. Agglomeration externalities . Ogawa & Fujita (1980)
 3. Imperfect Competition, Oligopolistic (Fujita, 1988) and Monopolistic.



Krugman (1991)

- Assumes taste diversity, economies of scale (IRS) at the level of the firm and iceberg trade costs. Krugman & Venables (1995) and Krugman & Livas (1995) share the same assumptions. It draws on Stiglitz & Dixit(1977).
- There are two regions. In each one there are two sectors, manufacturing (IRS) producing N varieties and agricultural (CRS) producing a homogenous good. Workers (peasants) can (cannot) migrate across space (centrifugal force). There is not mobility across sectors.
- His assumptions result in agglomeration economies (centripetal force): the higher the number of consumers/workers located at one particular place the higher real wages are. Migration is a pecuniary externality.
- In the short-run, markets are in equilibrium but real wages could be different across regions. In the long-run, migration is not optimal.



Krugman (1991)

- Iceberg trade costs simplify the solution of the equilibrium conditions and drive firms to locate near large factor and product markets.
- IRS drive firms to locate in a single place as the Spatial Impossibility Theorem of Starrett (1978) states.
- The model does not have a closed-form solution.



Krugman & Venables (1995)

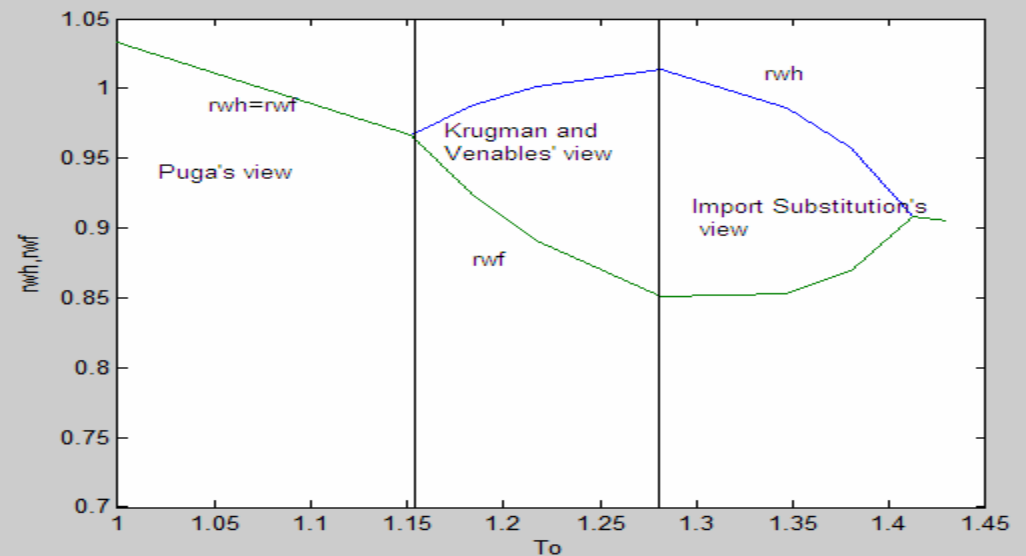
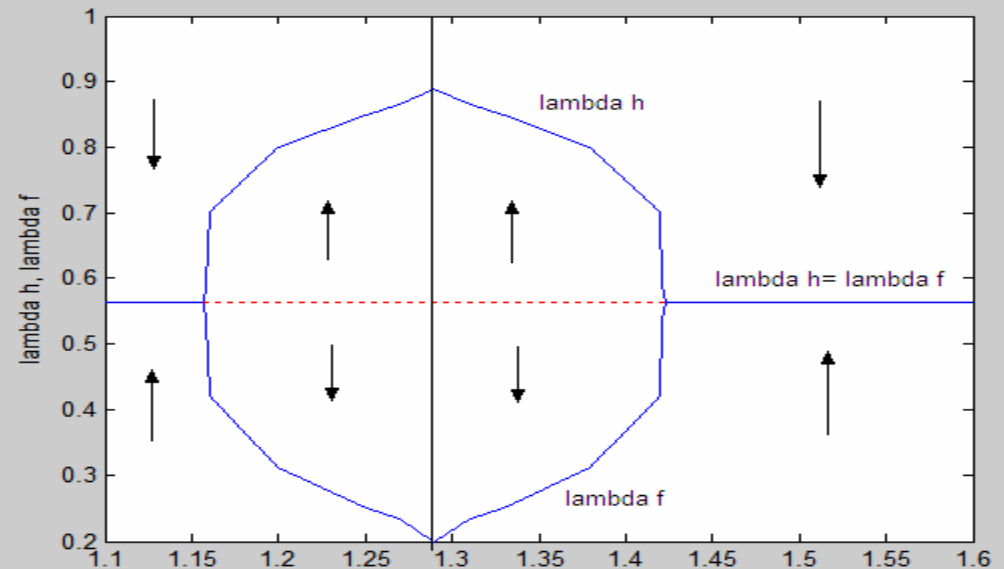
- They claim that the convergence of welfare in the world is the result of falling international trade costs.
- Assumes two countries. Each one with two sectors, manufacturing (IRS) and agricultural (CRS). Workers can migrate across sectors but not across countries.
- They introduce a market of intermediate inputs, which creates forward linkages.
- Puga (1998) nests Krugman & Venables (1995). Both papers validate 3 stories of Economic Development. Agglomeration is the result of consumer-proximity, supplier proximity and competition in the labor market.



Krugman & Venables (1995)

The Bell-Shaped Curve of International Trade Openness

- $\lambda f(h)$ denotes the fraction of the population in the foreign (home) country in the industrial sector.
- $rw f(h)$ denotes the real wage of the population in the foreign (home) country in the industrial sector.
- To = International trade costs.
- If To is either high or low industry is evenly distributed across countries.
- For intermediate levels of To , industry is concentrated in a single city. Therefore, welfare disparities arise.



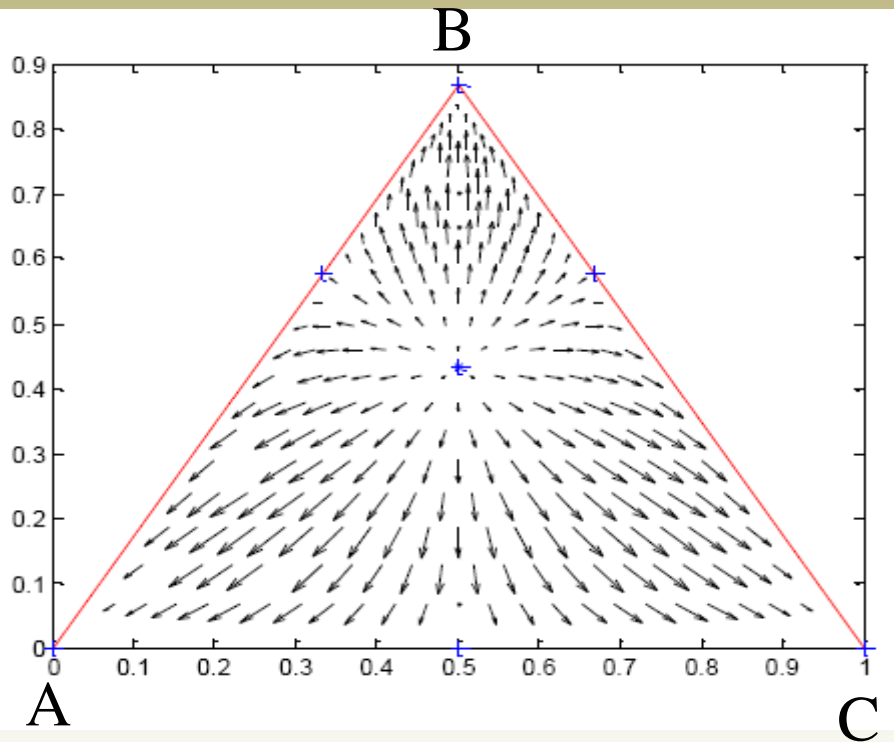


Krugman & Livas (1996)

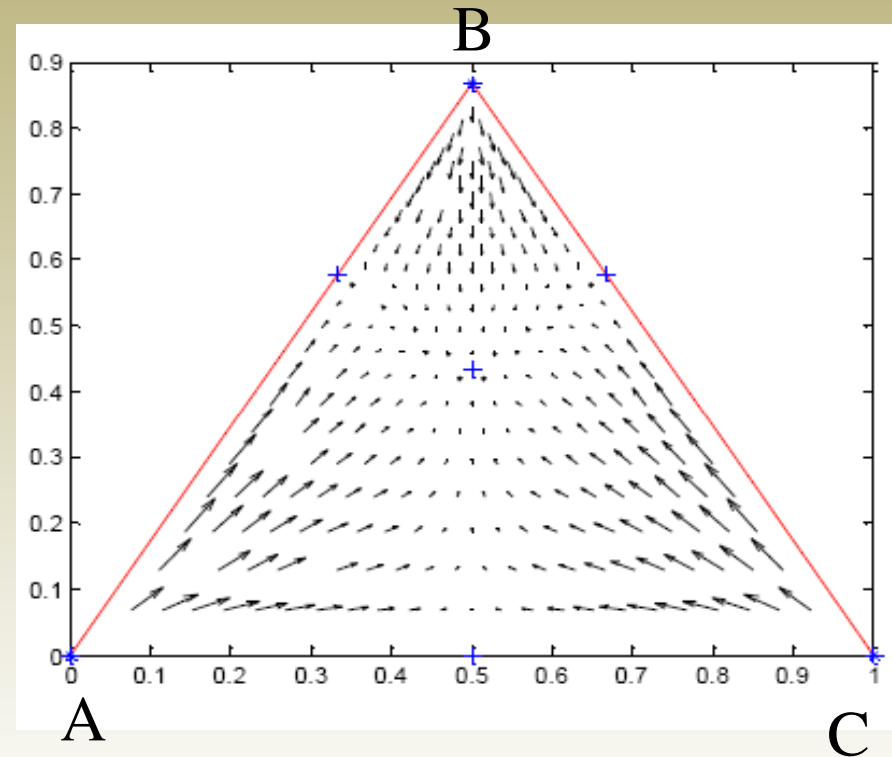
- They claim that high international trade costs impact positively on cities' size.
- There is only one industrial sector; 1 foreign city and 3 local cities. People can migrate within the country but not across countries. Trade costs are divided upon internal and international.
- If international trade costs are high, then firms and workers have incentives to cluster in a single place because agglomeration economies are enhanced. For example, the size of Mexico City can be explained by the adoption of the “import substitution” paradigm between 1950-1985.
- Ades & Glaeser (1995) find that higher levels of trade openness (share of trade in GDP) reduces the size of world's main cities. Ramírez Grajeda & Sheldon (2008) disentangle the effect of trade openness on cities' size around the world: main ones are negatively affected, whereas secondary ones are positively affected.



Krugman & Livas (1996)



High trade costs imply that population **agglomerates in city A**.




Low trade costs imply that population is **evenly distributed** across cities.



Final Remarks

- The NEG provides a setting where demand (population) in one particular place is endogenous.
- Migration across regions is driven by pecuniary considerations.
- Agglomeration is a self-reinforcing process and features path dependency.
- Exists a consensus within the profession that NEG main theoretical outcomes are very appealing. However, its predictions still need to be validated. This task is far from being easy for the following fundamental reason: since location issues imply increasing returns to scale, then non-linear relationships arise. Furthermore, some of the most representative papers lack of analytical solutions and their setting are highly stylized. As a result of this technical obstacle, empirical work is not abundant and robust enough.



Many thanks