

Quantitative Economics for the Evaluation of the European Policy

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Increasing returns and output specialization

In a famous contribution in 1991 Paul Krugman discusses how also with labour mobility the presence of increasing returns to scale leads to disparities among regions. The aim of the model is also to stress the importance of structural change as a crucial perspective to study such a type of phenomenon, i.e. as output specialization can help to explain differences in the level of development.

- Consider two regions, region A specialized in agriculture, and region M specialized in manufacturing.
- The production function of the two types of goods are respectively given by:

$$Q_A = F_A(L_A), \quad (1)$$

and

$$Q_M = \kappa F_M(L_M)., \quad (2)$$

where κ is a parameter measuring the technological progress in

Labour mobility and increasing returns to scale (cont.d)

- Workers can freely move between the two regions and their total number is L , therefore:

$$L_A + L_M = L. \quad (3)$$

- Assuming that factor markets are competitive, then nominal wage in the two regions are given by:

$$W_A = P_A \frac{\partial F_A}{\partial L_A} \quad (4)$$

and

$$W_M = P_M^\kappa \frac{\partial F_M}{\partial L_M}. \quad (5)$$

- In equilibrium with free mobility between the two regions:

$$W_A = W_M. \quad (6)$$

Labour mobility and increasing returns to scale (cont.d)

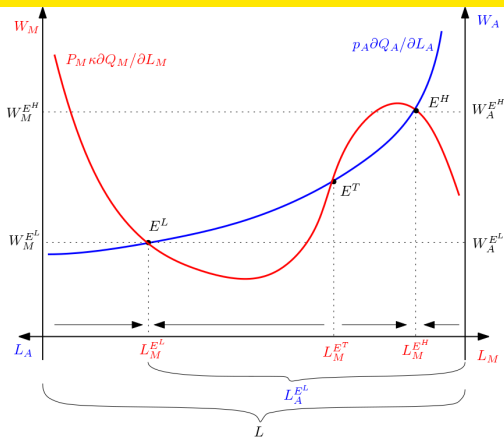


Figure: Allocation of labour between the two regions with increasing returns to scale in manufacturing

- The marginal productivity of labour is assumed to be decreasing only in agriculture, while in manufacturing there exists a range of increasing returns to scale, generally justified by the presence of fixed cost in the production of mass consumption goods.
- If the initial allocation of labour in manufacturing is below $L_M^{E^T}$, then the size of manufacturing is enough to exploit increasing returns to scale and the two regions converges to low-wage equilibrium E^L .

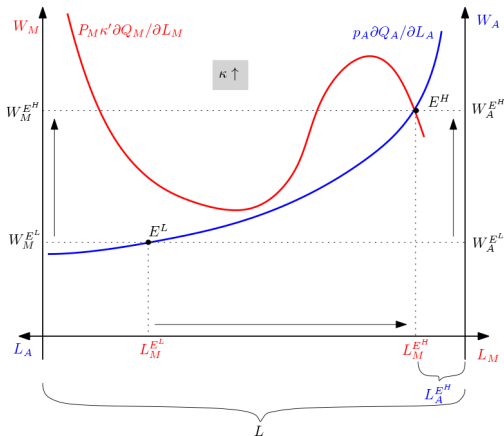


Figure: Reallocation of labour between the two regions when technological progress increases in manufacturing

- With the increase in the technological progress in manufacturing κ only the high-wage equilibrium E^H remains.
- There will be a strong migration from agricultural to manufacturing region, with an increase in wage paid in both regions. Such dynamics could happen in a very short time, as during the industrial revolution in many European countries.

Some final remarks:

- In the original model of Paul Krugman there are **high** and **low skilled workers** and only the former can migrate. This lead to differences in GDP per worker in the two regions, i.e. the model can explain **regional specialization, migration, and regional disparities**.
- **History** of a region, i.e. the size of labour markets and the type of production of a region, is the main determinant of the long-run outcome of the region. But also **expectations** can play a role in presence of increasing returns to scale, because the expectations of high returns in manufacturing can lead to a shift of workers in the sector/region, and the latter, in turn, could lead to a change in the long-run outcome.
- **Policy**, e.g. in favour of a reallocation of workers from agriculture to manufacturing, can have a role in presence of multiple equilibria.