## Motivation

- Lack of convergence of regional income within countries despite strong absolute convergence between countries
- We conjecture that this fact can be explained by persistent differences in human capital
- We measure regional human capital as a result of occupation-specific learning-by-doing, which is determined by the frequency of “complex” tasks in work
- This allows for a more differentiated view of human capital as opposed to crude measures such as years of schooling and socioeconomic characteristics
- Variation in complex tasks predicts variation in income levels on a regional level
- Complex tasks allow for better understanding of human capital formation and reduce unexplained growth of income attributed to total factor productivity

## Methodology and Data

- The data on occupational composition is from the Eurostat Labor Force Survey and on economic accounts from Eurostat, Penn World Tables, and national statistical offices for 2011 NUTS2 European regions
- Tasks are measured using the BmBB BmBB2012 survey for 2-digit ISCO classification of jobs
- By “complex” tasks we mean: improving existing processes, gathering information, facing new tasks, taking difficult decisions independently etc. – activities that involve solving novel and challenging problems
- We look at average yearly growth rates of regional GDP per capita between 2000 and 2012 and relate it to average values of investment, population growth and complexity of tasks in the same period
- Income per capita growth is described by a modified Solow model

\[
\frac{\dot{Y}}{Y} = g + \alpha \frac{X}{Y} - \alpha_k \frac{X}{Y} (1 - \alpha_k) \left[ \ln \frac{K}{N} - \ln \frac{K}{N_0} \right].
\]

(1)

A worker doing tasks with complexity value \(x\) accumulates human capital \(K\) according to

\[
\frac{\dot{K}(t)}{K(t)} = x - h(t).
\]

(2)

With a few assumptions on the starting distribution of \(h\) and mortality, in the entire population the inverse of average human capital is

\[
K_{2000} = \frac{1}{X} \left[ 1 - \left( \frac{\alpha}{\alpha} \left( 1 - e^{-\alpha T} \right) \right) \right].
\]

(3)

An increase in the complexity of tasks shifts the long run value of labour quality and average productivity, thus positively affecting income growth.

### Open Questions

- What makes some regions have more complex tasks than others?
  - Specialization in certain products due to international trade
  - Differences in local demographics
  - Agglomeration effects
- What is the optimal level of complexity in a region?
- What kind of policy can promote regional complexity?

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