

Measuring intangibles: *discussing* regional differences

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Going beyond Growth Accounting (GA)...

GA helpful summary metric approach:

- decomposes output growth into components of inputs, and helps measuring their contribution;
- Reduces the size of our “ignorance” (Solow, 1957), explicitly measuring the role of intangibles as sources of innovation and growth;

BUT it does NOT

- Investigate causalities;
- Address the role of complementarities and synergies between different investments;
- Account for institutional factors;
- Explain “residuals”.

...focusing on firms

To find evidence about the sources of technological and non-technological innovation, rely on firms:

- It is firms that innovate, not industries or nations;
- Aggregate analysis hides heterogeneity;
- Firms innovate in a variety of ways, not only technologically;
- Countries' innovative systems feature mixed patterns and impact on firm behaviour;

Micro-level analysis:

- (attempts to) model the channels through which specific knowledge assets and knowledge channels may impact on firms' productivity;
- Sheds light on the role of innovation inputs, outputs, and policies.

Regional patterns of Intangible Capital

Geppert & Neumann (DE) and Piekkola and Lintamo (FI) use large micro datasets “to assess the importance of intangible capital, for the economic performance of establishments (firms) and regions”

	Germany	Finland
Focus	Establishments + regions	Firms + regions
Data	LEED data + Regional Accounts + EUKLEMS data	LEED data + StatFi Regional Accounts + Asiakastieto balance sheet data
IC type considered	Organisational, ICT, R&D	Organisational, ICT, R&D
IC calculation approach	Expenditure-based (CHS)	Expenditure-based (CHS) & Performance-based
Estimation strategy	Pooled cross section (1999 – 2003)	Panel data (1998-2008)

INNODRIVE's expenditure-based approach

See Görzig, Piekkola and Riley (2011).

Concentrate on the assessment of own account production of intangibles (CHS also consider purchased intangible assets, classified as intermediate consumption).

Assume existence of a Cobb-Douglas production function describing the combination of labour, intermediate and capital needed to produce intangible assets.

To quantify the production function refer to the relationship between labour, intermediate and capital in those industries engaged in market production of comparable types of goods (NACE Rev 1.1):

- 72, Computer and related activities (as proxy for ICT goods);
- 73, Research and Development (as proxy for R&D goods);
- 74, Other business activities (as proxy for OC goods).

INNODRIVE's expenditure-based approach

Implicitly assumes constant returns to scale and perfectly functioning markets....

Total factor multipliers – as weighted average of country specific outcomes - are used for each intangible type for all countries...

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INNODRIVE's expenditure-based approach

72.82 Packaging activities

91.1 Activities of business, employers and professional organizations

64.2 Telecommunications

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INNODRIVE's performance-based approach

See Görzig, Piekkola and Riley (2011).

Investment in intangible is assumed to be proportional to the product of marginal productivity and hours worked in the same occupation.

Allow productivity to deviate from the wage rate.

Use the expenditure-based estimates as a starting point to re-estimate the productivity of workers using their contribution to value added in the production of traded products and intangible capital goods.

“This approach provides a robustness check on the assumptions we make concerning the combined multiplier” (p. 19).

.... But does it?

The paper often highlights the positive productivity-wage gap of organisational workers and discusses complementarities.

It would be interesting to see how such features are addressed..

INNODRIVE's regional dimension

It is based on the concept of planning regions, i.e. self-contained labour markets, divided into:

- 1) Large metropolitan areas (DE & FI 500k inhabitants);
- 2) Small metro areas (core cities: DE 200k-500k; FI 100k-500k);
- 3) Intermediate regions (DE > 150 sqkm; FI > 35 sqkm);
- 4) Rural regions (DE < 150 sqkm; FI < 35 sqkm).

Use average wages of establishments (firms) as dependent variable and firm, industry and regional characteristics as regressors. Investigate the existence of a connection between the productivity of establishments (firms) and the amount of intangible capital in the region.

Discuss economies of agglomeration and urbanisation (using an index of diversity).

INNODRIVE's regional dimension

You might want to consider Hannah and Kay's index (HK, 1977)

$$HK(\theta) = \left(\sum_{i=1}^N s_i^\theta \right)^{1/(1-\theta)}$$

Where s_i is the relative output of the sector, N the total number of sectors in the economy, and θ measures the extent to which the index is influenced by large sectors (See Curry and George, JIE, 1983).

Implicitly assume a linear relationship between industrial diversity of regions (i.e. economies of urbanisation) and the average wage level of establishments (and intangible capital). See Imbs and Wacziarg (AER, 2003) about measures of sectoral concentration following U-shaped patterns.

Careful about using ad-hoc size categories for establishments (FI: <30; 30-90; 90-350, 350-700; > 750)

Discuss economies of agglomeration and urbanisation (using an index of diversity).

Regional findings

DE – Acknowledge the impossibility to identify spillovers and channel for transmission. Find:

- Net advantages of agglomeration have “more to do with knowledge and diversity than with clustering and specialisation” (p. 18).
- “Descriptive evidence for a close relationship between intangible capital and the economic performance of regions (+ for the level of economic activities, - for growth).

FI – Find “no clear relation between the share of innovative firms in the region and productivity” (p. 25).

But is it only about quantity? What if the presence of “outliers” in the respective IC categories is accounted for? (e.g. having Nokia or Siemens co-located in a region is not the same as having others ...) . Especially wrt R&D IC, would be good to account for the presence of (top, technical) universities.

Concluding

DE – Find intangibles to be considerably more concentrated geographically than economic activities as a whole.

Find that 2 x (IC intensity of establishments) -> increases average wage levels by 1%; but tangible capital intensity pushes up wages more than IC.

FI – “Organisational capital drives long run growth, whereas the accumulated investment into R&D capital has the opposite effect” (p. 32)

very dangerous policy message ...what about complementarities?

What about within-industry reallocation? Would be interesting to address firm churning, and entry's contribution to productivity growth (see e.g. Foster, Haltiwanger and Syverson, AER, 2008)

Would be interesting to account for firms' and regions' openness, and see how this changes investment in intangibles, and intangible capital accumulation.

Exploit the full potential of data.

Thanks for your attention

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