Skills insights from the application of economic complexity to job postings data

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Introduction

Lightcast

We are a labour market analytics company.

Our mission is **to drive economic prosperity** by providing the insights needed to build and develop our people, institutions, companies and our communities.

The team

Behind the work presented today there is a team of expert economists and data scientists: Duncan Brown, Mauro Pelucchi, Anna Clara Gatti, Simone Perego and Elena Magrini.

The data

In an ever changing world, real time data is essential to help inform decision making.

This paper uses Lightcast job postings library with over 80m job postings in the UK collected since 2012 to extract insights on skills.

The value of skills insights from job postings data

Answering burning questions

- How is demand for programmers changing over time?

- How widespread is demand for excel skills in the labour market? And what kind of level is required?

- What are the skills accountants have a relative comparative advantage in? How spendible are they in the labour market?

Supporting policymakers

- Education providers can use this data to shape their future course provision

- Employment agencies can better tailor and expand the support they give to people who are looking for jobs

- Local and regional organisation can use the insights to shape the economic development strategies in their region

Moving beyond skills frequency using economic complexity theory

- Concept firstly developed by Hidalgo and Hausmann in 2009 to identify countries comparative advantage.

- Economic complexity is used to capture the process of knowledge creation in an economy by looking at the combination of two metrics:

    1. **Diversity**: how many different sectors does a place specialises in?
    2. **Ubiquity:** how many places specialise in that particular sector?

- On average, economies with a higher ECI tend to have a competitive advantage in several highly complex sectors.
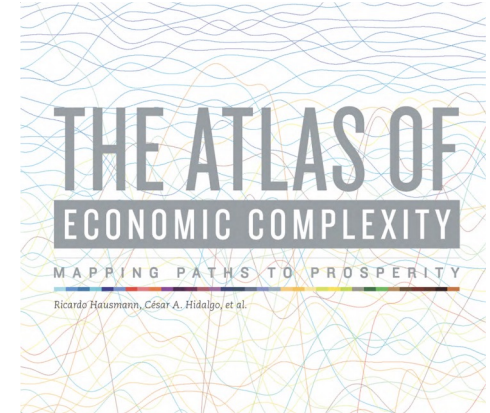
Four new metrics + two summary metrics on skills

- From area and sectors → to occupations and skills

- In the context of the labour market, economic complexity helps us measure the level of knowledge in an occupation as expressed by the skills it requires.

- This is done by combining together metrics on the diversity of each occupation based on the skills it requires and the ubiquity of these skills (i.e. how often are they required in different occupations).

- We present four metrics: diversity, ubiquity, RCA and relatedness + two summary metrics.
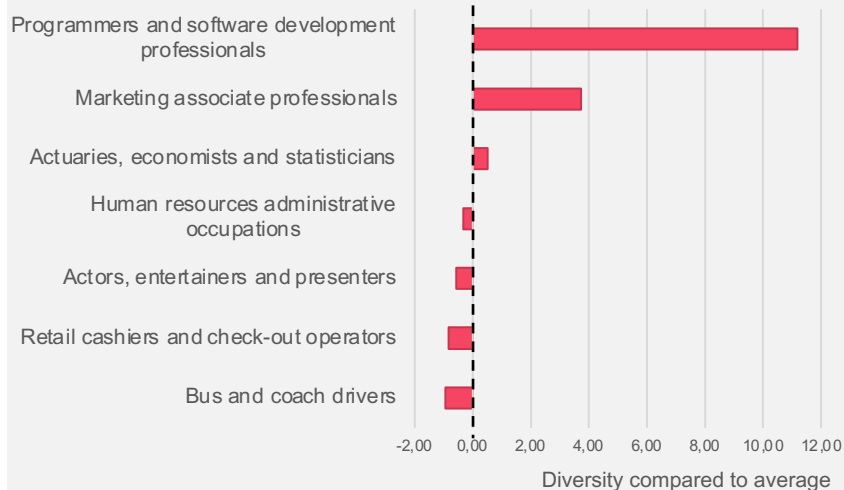
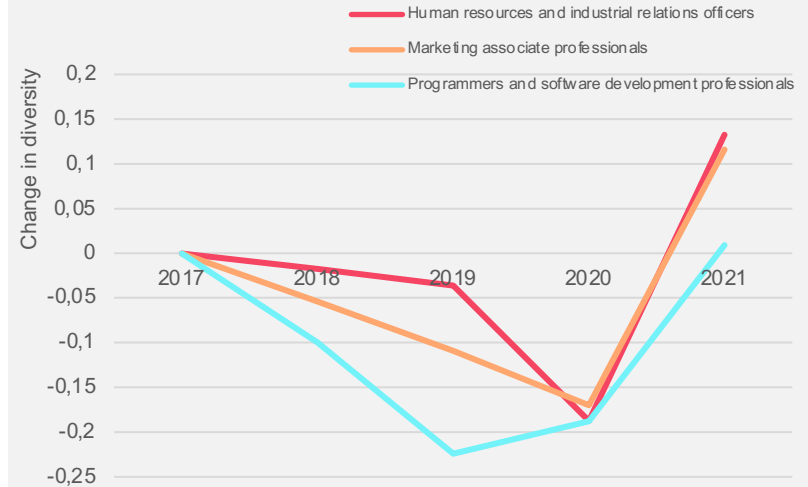# Diversity: how many types of different skills does an occupation require?

Higher diversity means an occupation requires more skills → it is more 'complex'.

An increase in diversity over time means the number of skills required in an occupation has increased. → it has become more 'complex'.

Comparing diversity across occupations

Diversity compared to average

Tracking diversity over time

- Human resources and industrial relations officers
- Marketing associate professionals
- Programmers and software development professionals
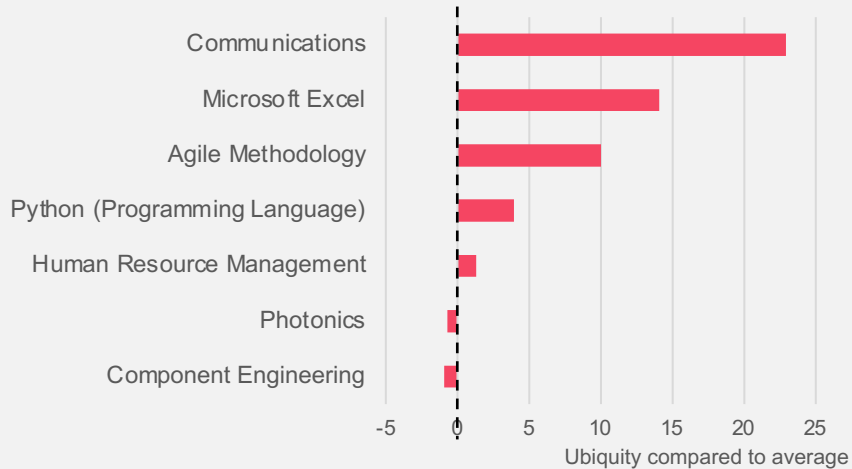
Change in diversity

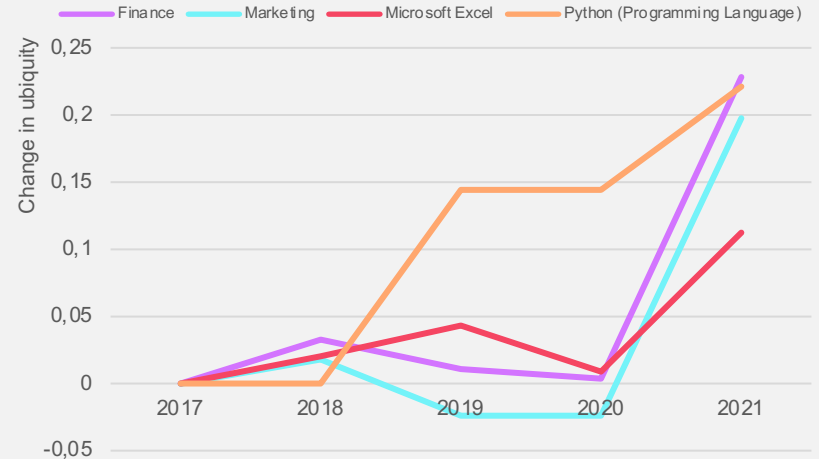# Ubiquity: how many occupations require this skill?

Higher ubiquity means a skill is more diffused among occupations.

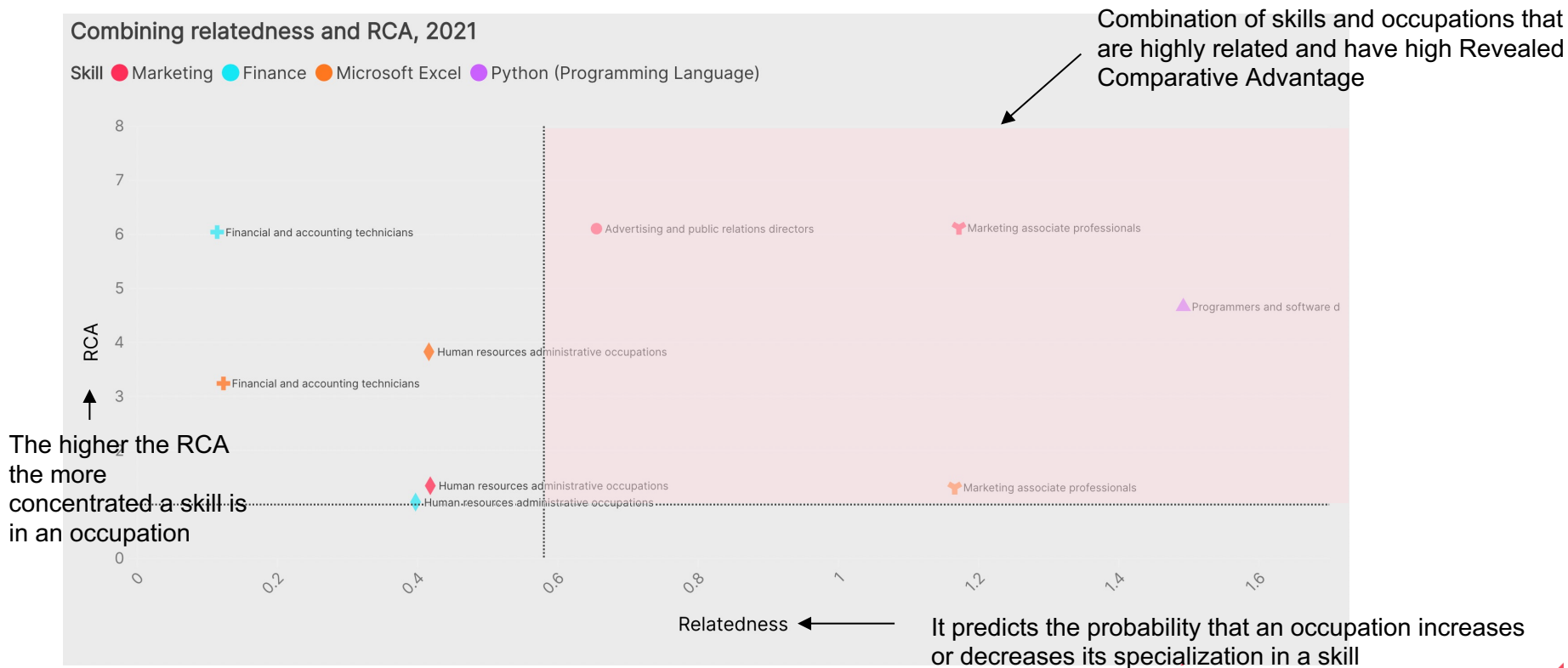An increase in ubiquity over time means a skill is becoming more diffused in the labour market.

Comparing skills ubiquity

Tracking skills ubiquity over time

Revealed Comparative Advantage (RCA) and Relatedness (1)

Combining relatedness and RCA, 2021

Skill 🔴 Marketing 🔵 Finance 🟠 Microsoft Excel 🟣 Python (Programming Language)

Combination of skills and occupations that are highly related and have high Revealed Comparative Advantage

The higher the RCA the more concentrated a skill is in an occupation

It predicts the probability that an occupation increases or decreases its specialization in a skill

- Financial and accounting technicians (RCA 6)
- Advertising and public relations directors (RCA ~6)
- Marketing associate professionals (RCA ~6)
- Programmers and software d... (RCA ~4.8)
- Human resources administrative occupations (RCA ~3.8)
- Financial and accounting technicians (RCA ~3.2)
- Human resources administrative occupations
- Human resources administrative occupations
- Marketing associate professionals

RCA (y-axis): 0, 1, 2, 3, 4, 5, 6, 7, 8
Relatedness (x-axis): 0, 0.2, 0.4, 0.6, 0.8, 1, 1.2, 1.4, 1.6
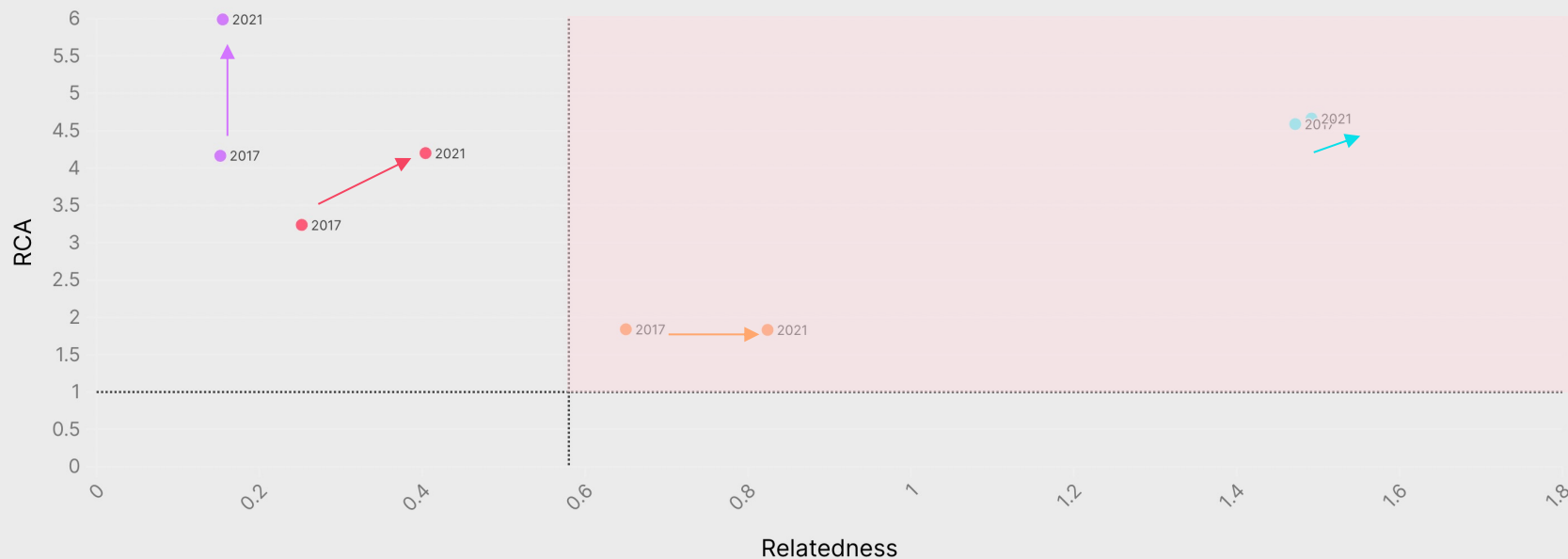
Revealed Comparative Advantage (RCA) and Relatedness (2)

Relatedness and RCA over time for Python in different occupations

Occupation ● Actuaries, economists and statisticians ● Programmers and software development professionals
● Business, research and administrative professionals n.e.c. ● IT engineers

Next steps

1. Assessing the value of combined skills within an occupation

Programmers and software development professionals			
Base skill	**Skill 2**	**Skill 3**	**Know how level**
Computer science	Python	Algorithms	High
	Python	APIs	Mid
	Python	Management	Low

2. A summary metric for skill complexity in each occupation

Programmers and software development professionals		
High know-how	**Middle know-how**	**Low know-how**
Algorithms	Google Cloud	Data Modeling
Computer Science	Agile Methodology	Marketing
Github	Software Testing	Microsoft Software

3. Other metrics to measure the skills surface

Thank you! Any questions?

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