

# Measuring the Economic Flows of UK Human Capital

**Sami Mubarak**

Economist

Productivity, Innovation and Research Division

Office for National Statistics (ONS)

United Kingdom

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# Overview

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# What is Human Capital?

*“The knowledge, skills, competencies and attributes embodied within people that facilitate the creation of personal, social and economic well-being.”*



Organisation of Economic Cooperation and  
Development (2001)

# Inspiration for the Research

- Methods for estimating the stock (total amount) of human capital have been established and internationally agreed
- **Less agreement, guidance or research on calculating the economic flows** associated with the human capital stock
- Economic flows (or transactions) explain the change in the stock from one period to the next



# Our Research

- **Identified and estimated these economic flows associated with the UK's human capital stock** between 2005 and 2020
- **Decomposed the change in the nominal human capital stock from one year to the next** into various components and explored how these may be incorporated into the national accounting framework
- **Mapped these components to the broader flow categories** associated with the System of National Accounts 2008 (SNA 2008):
  - Gross Capital Formation
  - Capital Consumption
  - Revaluations
  - Other Changes in Volume

# Measuring the Human Capital Stock

# Calculation of Lifetime Earnings (LE)

$$LE^{s,a,e} = EA^{s,a,e} \cdot ALI^{s,a,e} + \left\{ \left[ \sum_e^6 (LE^{s,a+1,e} \cdot PROB^{s,a,e}) \right] \cdot \left[ (1 - MORT^{s,a}) \left( \frac{1+r}{1+\delta} \right) \right] \right\}$$

$LE^{s,a,e}$  = average projected lifetime earnings for all individuals in a given sex, age and highest qualification level group

$EA^{s,a,e}$  = proportion of people economically active for a given sex, age and highest qualification level group

$ALI^{s,a,e}$  = annual employee earnings for individuals in a given sex, age and highest qualification level group

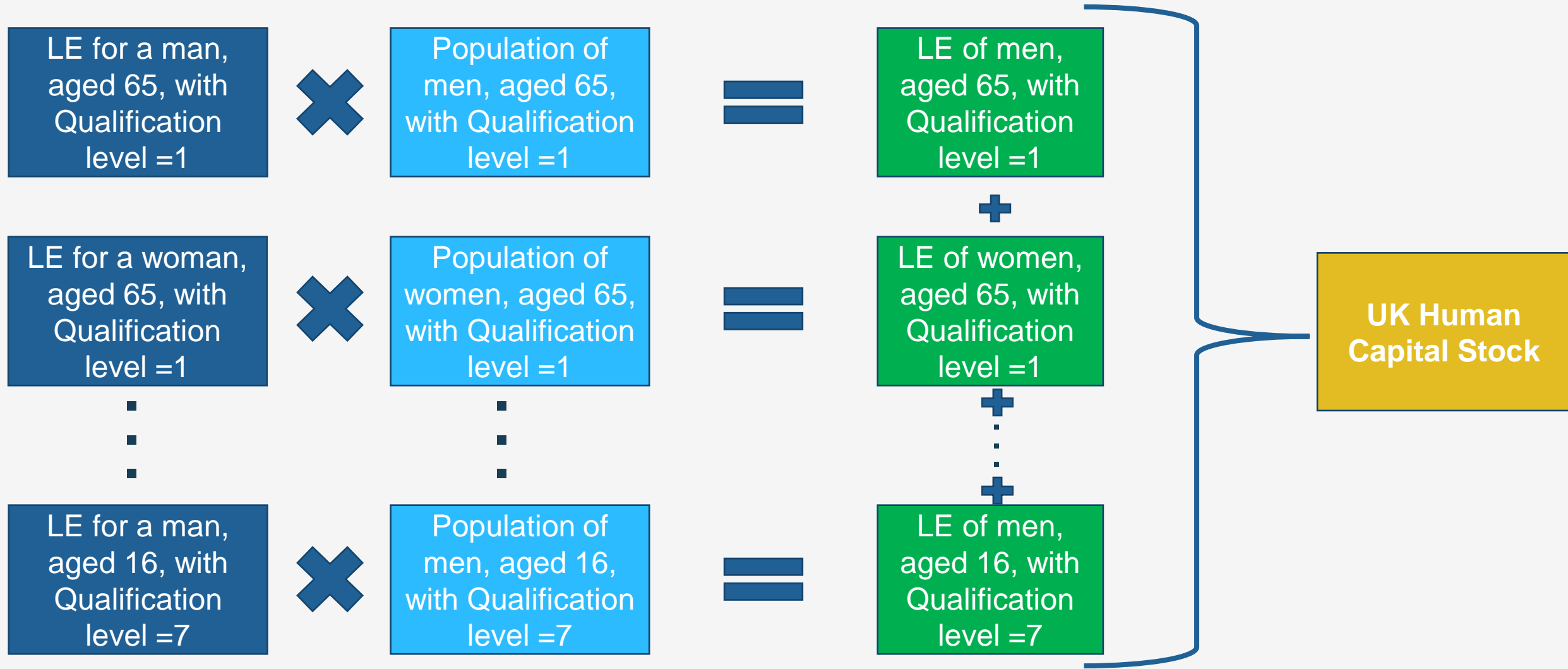
$PROB^{s,a,e}$  = probability that the individual in a given sex, age and highest qualification level will increase their highest qualification level in a single year's time

$MORT^{s,a}$  = Mortality rate for an individual in a given sex and age group

$r$  = Nominal wage growth rate (= 2%)

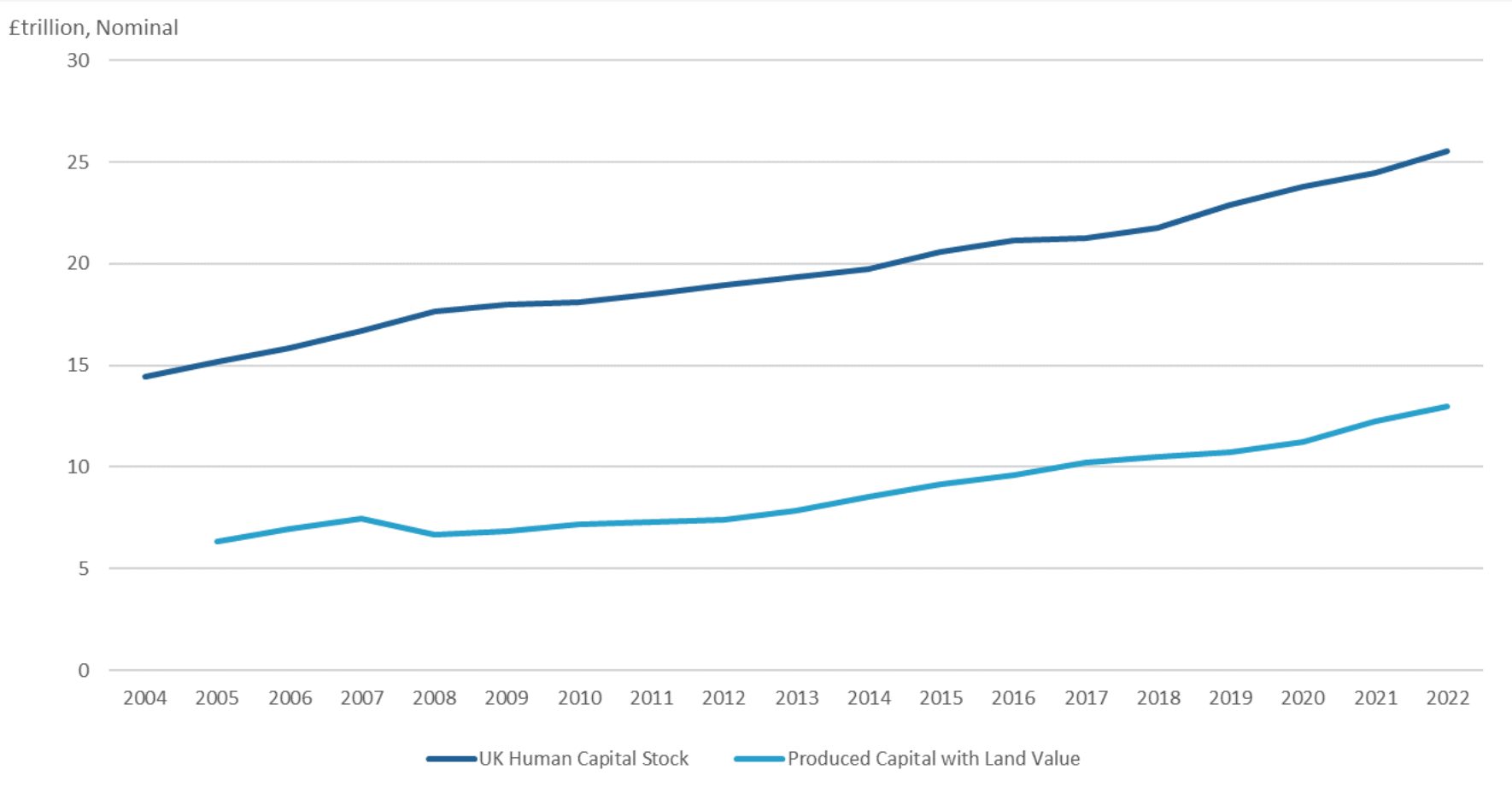
$\delta$  = Discount rate (= 3.5%)

# Visualisation of UK Human Capital Stock





# UK Human Capital Stock Through Time

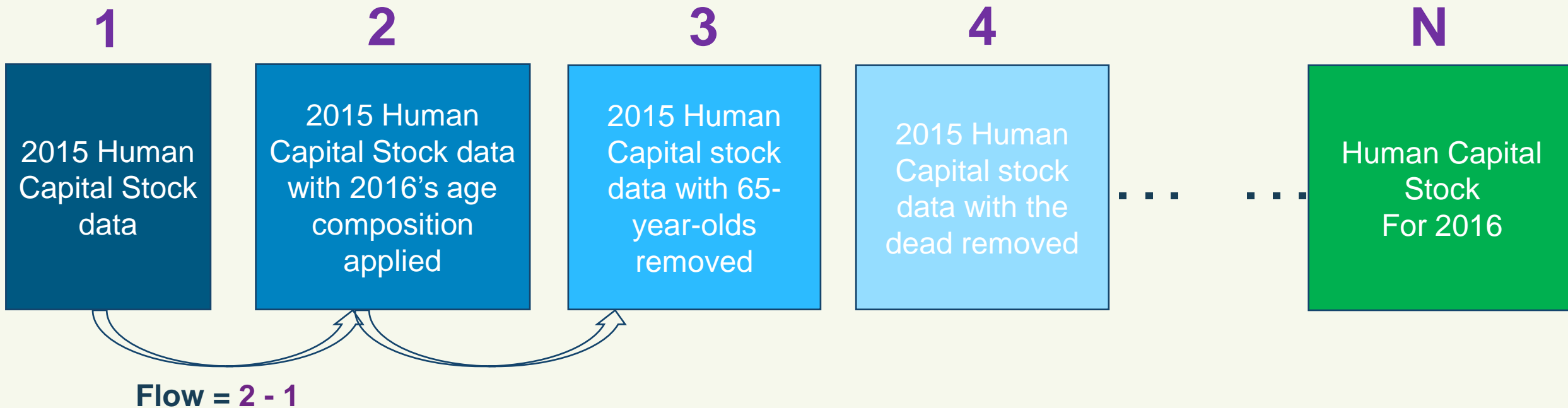


- UK human capital stock in 2022 was £25.5 trillion in nominal terms
- UK's Produced capital stock (machinery, equipment, buildings, roads, intellectual property products) plus the value of UK land was £12.97 trillion in 2022 in nominal terms
- UK GDP for 2022 was £2.5 trillion in nominal terms

# Research Methodology

# Calculation of Economic Flows

- **Aim:** Decompose the change in nominal UK HC stock so we can assign the resulting components to the national accounts economic flow categories
- **Method:** Sequentially and cumulatively alter the variables in Year T's human capital dataset so that they reflect the variables in year T+1's dataset
- After each change, the stock is recalculated and the flow is the difference between the newly imputed stock value and the previous stock value (before the change was implemented)



# Changes Implemented

Change Group	Specific Change	SNA 2008 Flow Category
Population Composition Changes	Sex Composition Change	Other Changes in Volume
	Age Composition Change	Other Changes in Volume
	Highest Qualification Level Composition Change	Gross Capital Formation
Total Population Changes	'Retirement Effect'	Capital Consumption
	Death	Capital Consumption
	'Ageing Effect'	Capital Consumption
	Inflow of New 16-Year-Olds	Gross Capital Formation
	Net Change in Economic Activity	Other Changes in Volume
	Residual Population Change*	Other Changes in Volume

\*The effect of net migration on human capital stock is implicitly captured in the Residual Population Change component

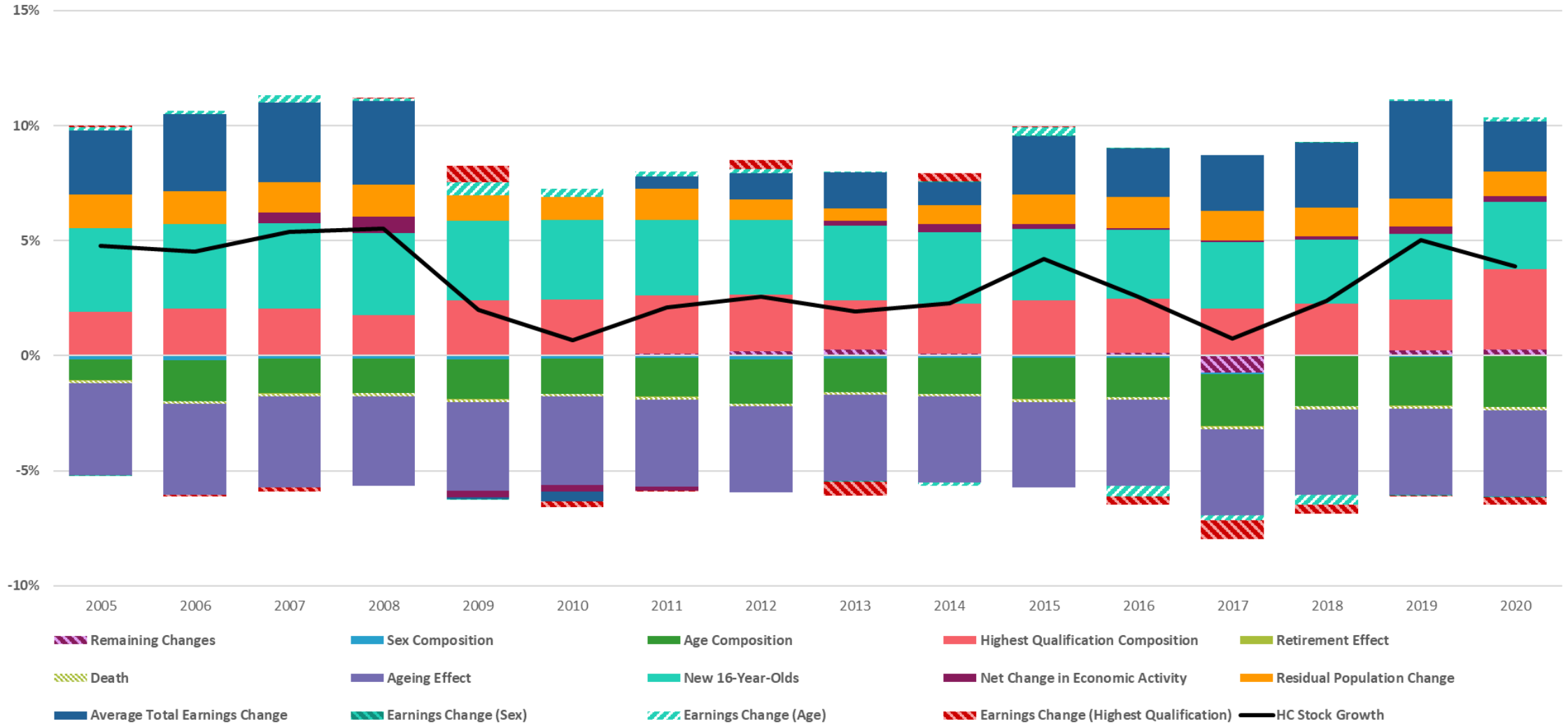
# Changes Implemented (Continued)

Change Group	Specific Change	SNA 2008 Flow Category
Total Earnings Changes	Average Total Earnings Growth	Revaluation
Earnings Distributions Changes	Earnings Change by Sex	Revaluation
	Earnings Change by Age	Revaluation
	Earnings Change by Highest Qualification Level	Revaluation

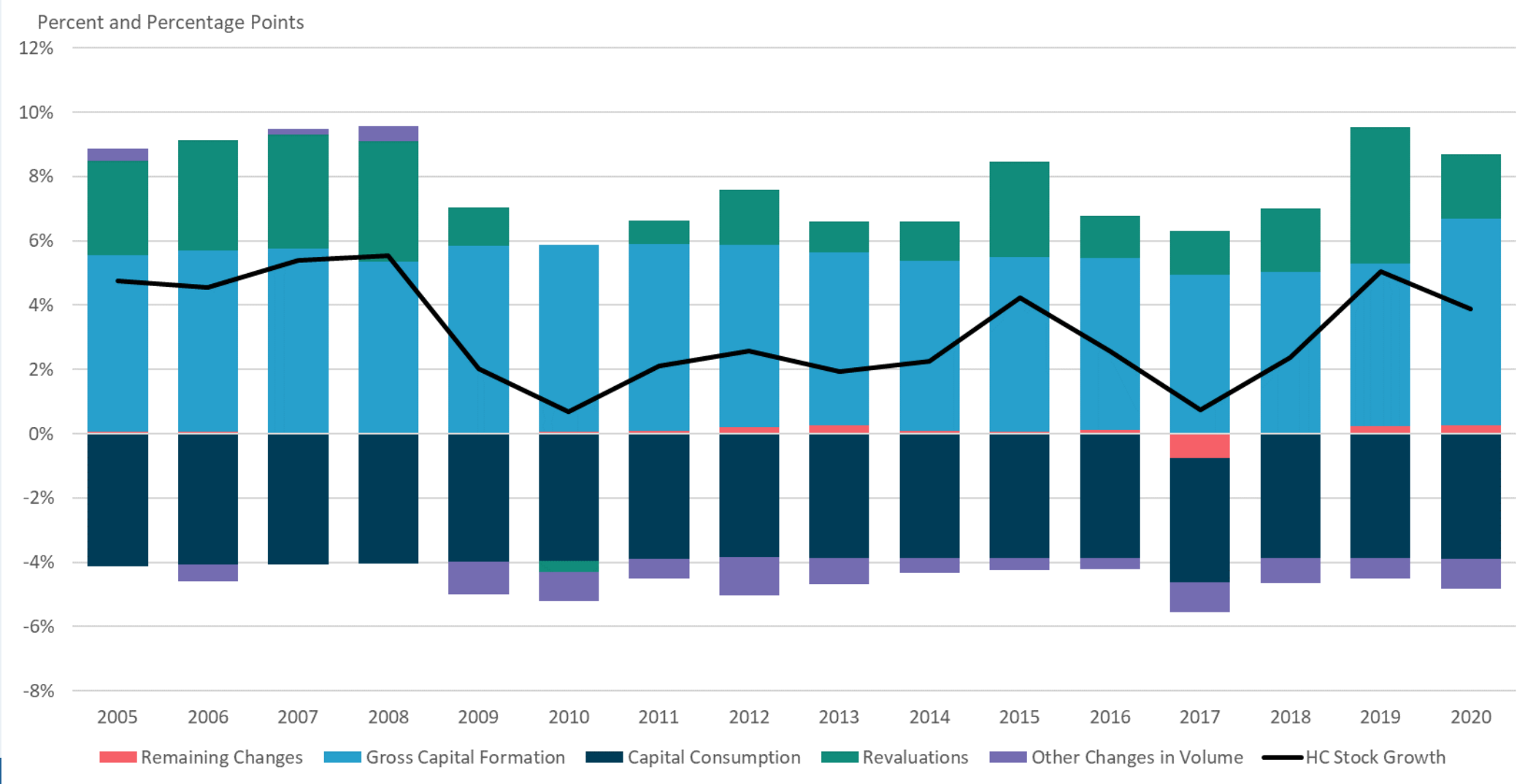
# Results

# Contributions to HC Stock Growth: Economic Flows

Percent and Percentage Points



# Contributions to HC Stock Growth: SNA 2008 Flow Categories

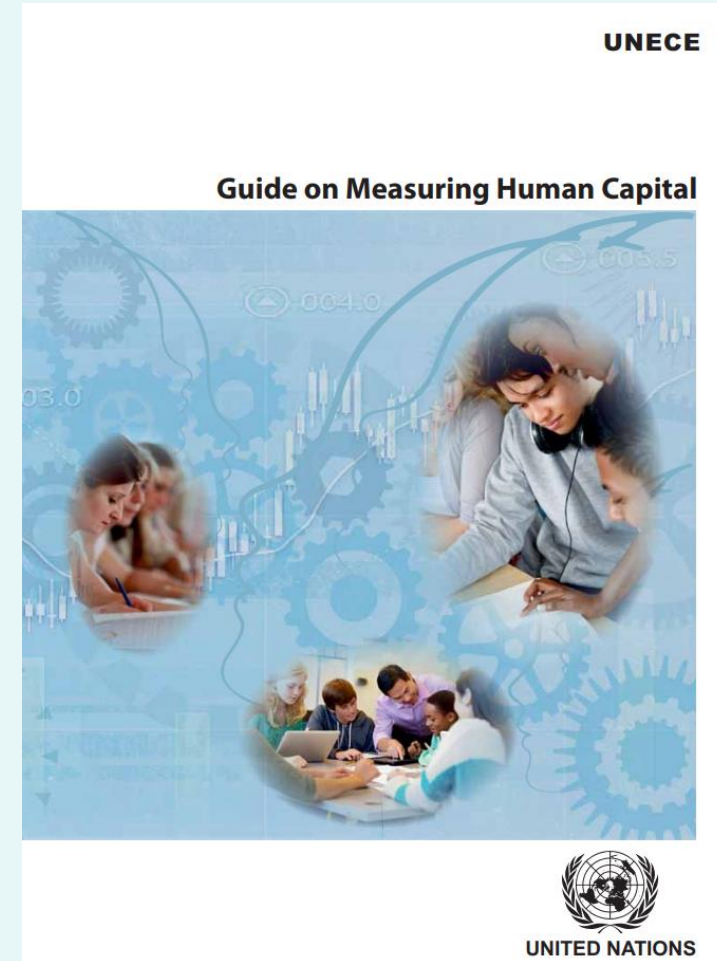
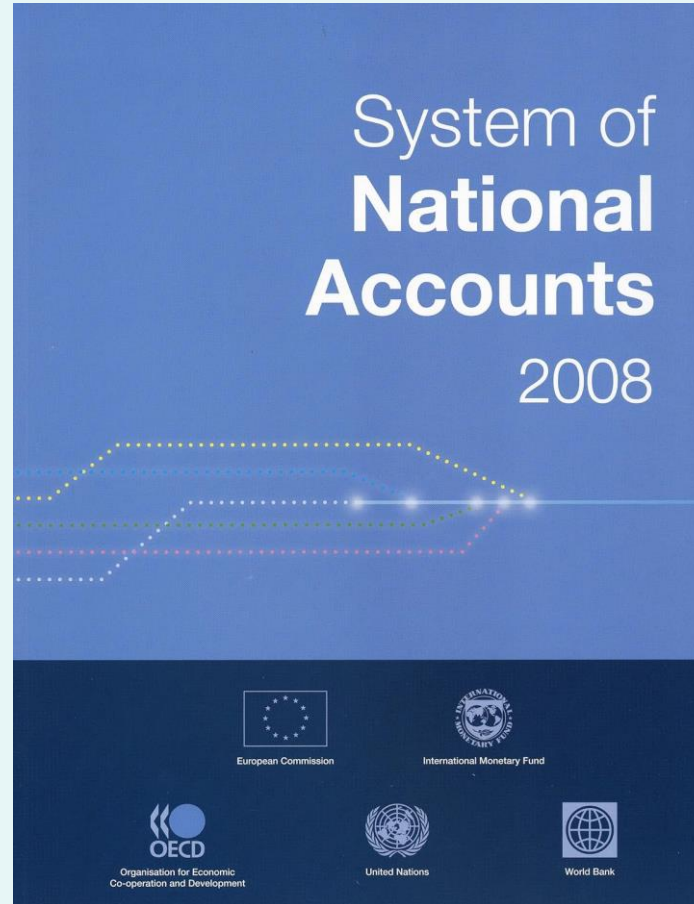




# Conceptual Differences Between SNA 2008 and UNECE 2016

# SNA 2008 vs UNECE 2016

- System of National Accounts 2008 (SNA 2008) is the international statistical standard for the national accounts
- The United Nations Economic Commission for Europe (UNECE) Guide on Measuring Human Capital 2016 provides the framework for measuring the human capital stock



# Treatment of Increased Educational Attainment

- In SNA 2008:
  - Value of **Gross Capital Formation (GCF)** should be fully reflected in an **equal change in the value of the stock**
  - GCF should be recorded when ownership of the product is transferred to the unit intending to use it as capital
  
- In UNECE:
  - Implies the value of (probability weighted) **future education increases is included in the stock value now**
  - This means the **future value of expected education is included in the stock as GCF before the education has been produced** which is at odds with SNA 2008

# Future Developments and Summary

# Potential Future Developments

- Develop a way to determine explicit effects of immigration and emigration on the UK human capital stock
- Sensitivity Analysis: Remove the expected value of education increases in current HC stock and see the effect
- Add an industry dimension to the data to focus on human capital in specific industries



# Summary

- Imperative to **develop statistics to understand how human capital stock is changing** through time and economic progress beyond GDP
- **Developed a method to estimate the economic flows** associated with the UK's human capital stock and mapped to National Accounts categories
- Great potential to develop this work further:
  - Effects of **net migration**
  - Add an **industry dimension**

Is this just the tip of the iceberg?



# Questions?

## QR Code to the Paper

**Research paper available here:**

<https://www.escoe.ac.uk/publications/measuring-the-economic-flows-of-uk-human-capital/>

**Contact:**

Sami Mubarak

Email: [sami.mubarak@ons.gov.uk](mailto:sami.mubarak@ons.gov.uk)





# Lifetime Earnings (LE)

- Human capital is measured by calculating individuals' discounted projected Lifetime Earnings (LE)
- This is the amount of earnings they could earn throughout their lifetime
- For the UK, ONS calculates the average LE for all individuals in each sex, age and highest qualification level group for ages between 16 and 65