Tips for teaching economics using data

Introduction

Real-world data in their varied forms are the authentic artifacts through which we observe economic phenomena. Such data can be used in learning and assessment activities to help students construct economic meaning and develop important employment skills in organising, interpreting and presenting quantitative data.

Data visualisation

One way of motivating economic concepts is to begin by beginning with a visualisation of the data, to stimulate students' interest. Evidence suggests that these visualisations can increase student engagement and deepen their understanding of economics, particularly at introductory level.

An important aspect of the visualisation is that there needs to be a striking aspect to draw the student's attention to an issue, concept or theory, creating a narrative for students to investigate. A time series graph with spikes or trends in the series can be a useful way of drawing the eye and stimulating interest.

The visualisation should prompt the question that starts the learning process: what is going on? This can then be followed up by: why is this happening?

For example, data visualisation is a powerful tool in raising awareness and interest in core macroeconomics. This then facilitates the application of economic analysis and therefore the consideration of debates, controversies and alternative schools of thought around those issues. Figure 1 shows one important macroeconomic indicator: the rate of Consumer Prices Index including owner occupiers' housing costs (CPIH) inflation in the UK. The CPIH is the preferred inflation measure of the Office for National Statistics (ONS).

Figure 1: UK rate of CPIH inflation

Note: CPIH is CPI plus owner-occupied housing costs and council tax.
Source: Based on time series data, ONS (series L55O)

In the graph above, it might be expected that student's attention will be drawn to the sharp uptick in inflation from 2021. They should be suitably intrigued and quickly follow up with the question as to why this is happening.

Sometimes a chart which shows a contrast between two economics series can be a powerful tool for illustrating changing relationships. For instance, Figure 2 shows the term structure of interest rates (yield curve) for the United States (US) at two different points in time.

Figure 2: US yield curves on 1/4/2021 and 1/4/2022
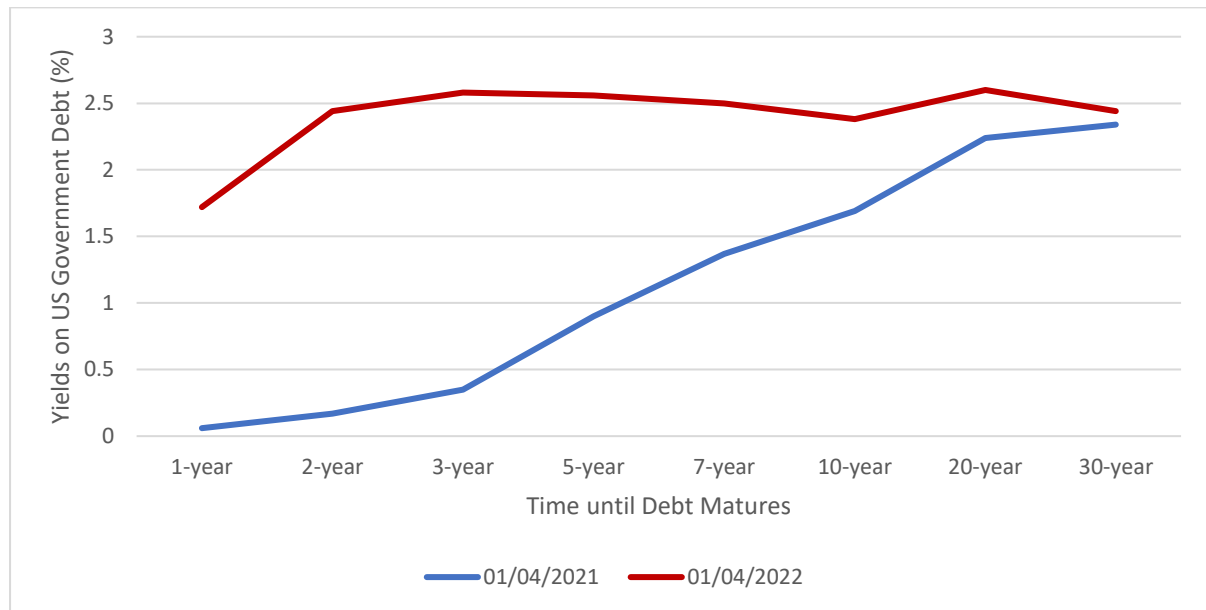
Source: US Treasury

When addressing the first question of the learning process, students should see that at the start of April 2021, the relationship between yield and maturity was positive, while a year later, the relationship was very different. The visible difference in the graph can be used to prompt students to consider why the relationship is so different.

In both cases above, answering why this relationship exists involves developing a conceptual understanding of the economic phenomena observed. For example, after students understand the reasons for the inflation shock or the changing slope of the term structure, formal economic models can be introduced to develop students' conceptual understanding. The intention, therefore, is that when confronted with economic data in the future, students can intuitively apply the underlying economic theory.

Data analysis

The analysis of data is one of three core competencies, alongside the application and effective communication of knowledge, that is identified by the Government Economic Service (GES) technical framework 2022. This document details the technical standards expected from government economists. Components of this core competency include the sourcing, organising, interpreting and presentation of data, and the application of appropriate statistical and spreadsheet software.

The use of data-based projects can be designed to require students to source and analyse their own dataset, thereby aligning their work with key employment skills, and align with *authentic* assessment. There are important pedagogical benefits of encouraging students to

identify and source their own unique evidence to demonstrate their understanding of a particular issue or economic concept.

Firstly, working with data can foster student confidence and help them to overcome any data-related anxieties that could be detrimental to their development as economists and interest in the subject. Secondly, data-based projects can enable students to feel that they are discovering things for themselves and constructing their knowledge and understanding as they do so. Consequently, they have a potentially unique perspective or research process to bring to discussions on a particular topic. Such active assessment has been found to improve engagement and academic performance.

To illustrate the latter, consider CPIH inflation further. We can decompose movements in the CPIH inflation by reference to 12 broad *divisions* based on the Classification of Individual Consumption According to Purpose (COICOP). Students could, for example, look at rates of inflation in particular divisions, such, as transport (Division 7) and housing, water and fuels (Division 4), alongside the overall rate of CPIH inflation. This is illustrated in Figure 3. Students could also analyse inflation rates of *classes* within the broad divisions. The key is that students are able to take ownership of the task and, through research and enquiry, deepen their understanding.

Figure 3: Rates of inflation by specific divisions
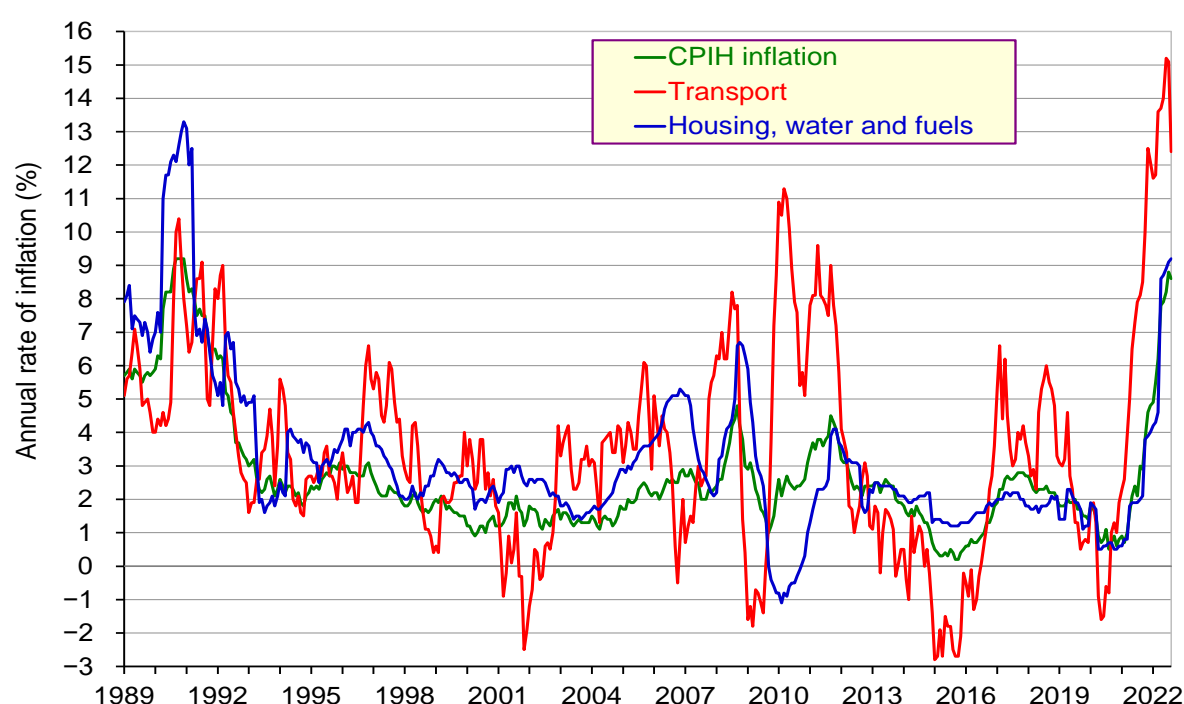
Notes: CPIH is CPI plus owner-occupied housing costs and council tax; core inflation is CPIH inflation excluding energy, food, alcoholic beverages and tobacco.
Source: Based on time series data, ONS (series L55O, L55S and L55V)

Conclusion

By incorporating data visualisation and analysis in our teaching we provide an authentic learning and assessment experience for students. This will help to further develop the competencies demanded by employers of economics graduates, such as the Government Economic Service in the UK. Further, it will stimulate student interest in the discipline –

principally students see the relevance of the discipline and its tools of analysis by working with data in an active way.

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