

# Technological obsolescence goes hand in hand with economic growth

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The growth in the Gross Domestic Product (GDP) of countries is largely linked to technological advance, because the latter encourages productivity. This technological advance is often associated with capital owing to the replacing of machinery and equipment that it entails. This firstly influences the fact that capital accumulation increases a country's GDP, and secondly, the fact that the capital depreciates because the existing machinery becomes obsolete. Therefore, it has been proven that the countries with high capital depreciation have in the long term a high growth rate. A UPV/EHU researcher has built an economic model that takes this positive correlation into consideration. Her research has been published in the journal *Economic Modelling*.

The standard economic models used to analyse economic growth as well as fluctuations fail to reflect the evolution in capital depreciation properly. For this very reason, "traditional models regard this depreciation as constant," explained Ilaski Barañano, a researcher in the department of the Fundamentals of Economic Analysis I. In other words, they consider that all the machinery, technology, buildings, workshops, scientific equipment and everything else end up obsolete in a constant way and at a constant pace in all countries. Nevertheless, "the data obtained in different countries show that the capital depreciation rate changes over time", she added.

What is more, the researcher has observed in the research conducted with a researcher at the Pablo de Olavide University that a positive correlation exists between capital depreciation and [growth rate](#) in 101

countries. There is a correlation but no causality. Barañano explained that "the existence of a positive correlation between both variables does not mean that one is the cause of the other. The relation between the two variables is positive, nothing more".

Likewise, the standard models assume that the growth rate of a country's GDP trend is fixed. Barañano confirms that this assumption is also wrong and that the trend varies depending on economic fluctuations. Therefore, "when the economic fluctuations are favourable, productivity in the country receives a boost and, as a result, GDP grows in a constant way".

Barañano has explored the possible theoretical explanation that could account for the correlation existing between the long-term growth rate, the level of persistence and capital depreciation. To do this, she has put forward a simple economic [model](#) in which economic growth coincides with economic fluctuations and depreciation is linked to obsolescence. So the countries that achieve significant improvements in the productivity of the investment sector will see a significant growth rate in their GDP due to the boosting of capital accumulation. What is more, this technological advance causes the capital depreciation rate to be higher as a result of the obsolescence. "The theoretical forecasts obtained in this model coincide with the correlations observed in the data, which gives the model credibility," concluded the researcher.

## **A tool designed to obtain theoretical forecasts**

The model put forward is straightforward and easy to use. However, it does not include all the factors that affect real economies. For example, capital is not a homogeneous variable, it consists of various components but in this model it has been regarded as a single variable.

As it is a model that reflects the empirical evidence linked to

persistence, the long-term growth rate and the loss of capital value "can therefore be used to forecast the effect that may be brought to bear by economic policies on growth and GDP in the long term, as the latter have a direct influence on the investment sector and technological advances facilitate the improving of productivity and, as a result, growth in GDP," explained the researcher.

Barañano is planning to work on adjusting the model. "In our model we have established capital as a homogeneous variable and we know it is not like that. So we want to differentiate between the different types of capital (in other words, buildings, machinery, scientific equipment, transport equipment, etc.), and after analysing each one separately, we want to see what weight each one has in depreciation."

**More information:** Ilaski Barañano et al. Long-term growth and persistence with obsolescence, *Economic Modelling* (2015). [DOI: 10.1016/j.econmod.2015.08.014](https://doi.org/10.1016/j.econmod.2015.08.014)

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