KUNGL. VETENSKAPS-AKADEMIEN
THE ROYAL SWEDISH ACADEMY OF SCIENCES

The Royal Swedish Academy of Sciences has decided to award the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2018 with one half to **William D. Nordhaus** "for integrating climate change into long-run macroeconomic analysis" and the other half to **Paul M. Romer** "for integrating technological innovations into long-run macroeconomic analysis".

# The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2018

# The global integration of climate and growth

**We can meet the challenges of the future by making the right decisions today. This year's Laureates in Economic Sciences have broadened the scope of economic analysis by constructing models in which long-term welfare is linked to climate change and technological development. William Nordhaus created methods that help us develop economic measures to deal with climate change without unnecessarily high costs. Paul Romer showed how market forces drive innovation and technological development and how this process is influenced by patent systems and market conditions.**

At its heart, economics deals with the management of scarce resources. Nature and our knowledge comprise the framework for economic growth. Nature dictates the conditions and knowledge determines our ability to manage these conditions.

**Paul Romer** demonstrates how knowledge creation by firms and entrepreneurs can function as a driver for long-term economic growth. His main contribution, which was published in 1990, laid the foundation of what is now called *endogenous growth* theory.

The main driving force of economic growth is technological development, which is based on innovative ideas. However, previous macroeconomic research could not explain how market conditions affect that development. Paul Romer solved this problem by exploring what makes ideas distinctive: unlike products and services, new ideas can be spread and exploited infinitely. Therefore, they require special conditions to be created on a market. For example, the protection of intellectual property rights will affect the willingness of the firms to produce new ideas and innovations, which are then transformed into growth.

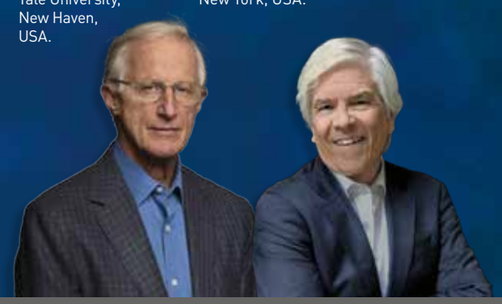
**William Nordhaus'** findings deal with interaction of society and climate. He started to work on this topic in the 1970s, when the research community had become increasingly worried about the rising temperatures on Earth resulting from the combustion of fossil fuels.

In the mid-1990s, Nordhaus became the first scientist to create an *integrated assessment model*, which is a quantitative model that describes the global interplay between the economy and the climate. Nordhaus' inter-disciplinary model is now widely spread and is used to simulate how the economy and the climate co-evolve over time. It makes it possible to examine the long-term consequences of climate policy interventions, for example carbon taxes, under different conditions.

The contributions of Paul Romer and William Nordhaus are methodological, providing us with fundamental insights about the factors driving technological innovation and climate change. This year's Laureates do not deliver conclusive answers, but their findings have brought us considerably closer to answering the question of how we can achieve sustained and sustainable global economic growth.

**William D. Nordhaus**
Born 1941 in Albuquerque, USA. Sterling Professor of Economics at Yale University, New Haven, USA.

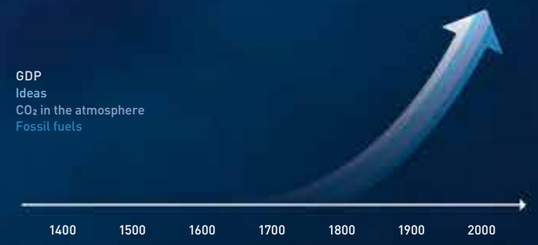
**Paul M. Romer**
Born 1955 in Denver, USA. Professor at NYU Stern School of Business, New York, USA.



Nordhaus' dynamic assessment model consists of three parts that interact with each other. The carbon-circulation part describes how carbon dioxide cycles through the atmosphere, plants and the sea. The climate part shows how greenhouse gases distort the balance between the input and output of the Earth's energy flows and how this changes the climate. The economic-growth part describes how the economy is affected by climate change and how carbon taxes or trading in emissions rights reduce carbon dioxide emissions.


Towards the end of the 18th century, economic development accelerated. New ideas and technical innovations were followed by rising GDP. At the same time, the use of fossil fuels increased, leading to an ever-higher carbon dioxide content in the Earth's atmosphere.

This year's Laureates have provided us with new tools to influence this development. Romer has shown us the conditions that are necessary for new technologies to emerge in a market. Nordhaus has developed models for calculating how the use of fossil fuels can be phased out without too much cost.




**LEARN MORE ABOUT THE PRIZE IN ECONOMIC SCIENCES AT WWW.KVA.SE** More information about The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2018 is available at *www.kva.se/prizeeconomicsciences2018* and *www.nobelprize.org*, with detailed information about the Prize and the Laureates, suggested reading and videos.

**Editors:** Per Strömberg, Per Krusell and John Hassler, The Committee for the Prize in Economic Sciences in Memory of Alfred Nobel, The Royal Swedish Academy of Sciences; Joanna Rose, Science Writer; Clare Barnes, Translator; Sara Gustafsson, Editor, and Virág Angyal, Nobel Assistant, The Royal Swedish Academy of Sciences. **Graphic design:** IVY Agency AB **Illustrations:** Johan Jarnestad/Infographics.se **Print:** Åtta45

Printing and distribution made possible by VOLVO


Box 50005, SE-104 05 Stockholm, Sweden
+46 8 673 95 00, kva@kva.se, www.kva.se
Posters may be ordered free of charge at www.kva.se/nobelposters