Bankarstvo, 2018, vol. 47, br. 4 124
Primljen: 20.12.2018. Prihvaćen: 10.01.2019.

pregledni naučni članak

doi: 10.5937/bankarstvo1804124L

Zlata Lukić

Udruženje banaka Srbije
zlata.lukic@ubs-asb.com

Vilijam Nordhaus i Pol Romer

UZROCI I POSLEDICE EKONOMSKOG RASTA

Rezime

Nobelovu nagradu za ekonomiju u 2018. godini dobila su dvojica američkih naučnika - Vilijam Nordhaus i Pol Romer, za integrisanje klimatskih promena, odnosno tehnoloških inovacija u dugoročnu makroekonomsku analizu. Počev od sedamdesetih godina prošlog veka, Nordhaus razvija ekonomske pristupe globalnom zagrevanju, uključujući integrisane ekonomske i naučne modele sa ciljem utvrđivanja efikasnog puta za rešavanje problema klimatskih promena. Pol Romer se u svojim istraživanjima bavi time kako akumulacija ideja omogućava održiv dugoročni ekonomski rast i objašnjava na koji način ekonomske odluke i tržišni uslovi utiču na kreiranje novih tehnologija. Obojica ističu nesavršenosti tržišta i zalažu se za izraženije državne intervencije, apelujući na kreatore politika da uvedu odgovarajuće ekonomske mere, u čemu vide pravi put ka boljim rezultatima, globalnom napretku i prosperitetu.

Ključne reči: Vilijam Nordhaus, Pol Romer, Nobelova nagrada, ekonomija, ekonomski rast, klimatske promene, tehnološke inovacije, integrisani modeli ocene, teorija endogenog rasta

JEL: O10, Q54

Bankarstvo, 2018, Vol. 47, Issue 4
Received: 20.12.2018 Accepted: 10.01.2019

doi: 10.5937/bankarstvo1804124L

scientific review article

Zlata Lukić

Udruženje banaka Srbije
zlata.lukic@ubs-asb.com

William Nordhaus and Paul Romer

CAUSES AND CONSEQUENCES OF ECONOMIC GROWTH

Summary

The Nobel Prize in Economic Sciences for 2018 was awarded to two American scientists - William Nordhaus and Paul Romer - for integrating climate change, i.e. technological innovation into long-term macroeconomic analysis. Since the 1970s, Nordhaus has been developing economic approaches to global warming, including integrated economic and scientific models designed to identify an effective way to tackle climate change. In his research, Paul Romer deals with how the accumulation of ideas enables sustainable long-term economic growth and explains how economic decisions and market conditions influence the creation of new technologies. They point out the imperfections of the market and advocate for more pronounced state intervention, calling on policy makers to introduce appropriate economic measures, in which they see the right path towards better results, global progress and prosperity.

Keywords: William Nordhaus, Paul Romer, Nobel Prize, economics, economic growth, climate change, technological innovation, integrated assessment models, endogenous growth theory

JEL: O10, Q54

Švedska kraljevska akademija nauka dodelila je Nobelovu nagradu za ekonomiju u 2018. godini dvojici američkih naučnika - Vilijamu Nordhausu i Polu Romeru, za integrisanje klimatskih promena, odnosno tehnoloških inovacija u dugoročnu makroekonomsku analizu. U svojim istraživanjima oni su dotakli neka od gorućih pitanja o održivosti dugoročnog ekonomskog rasta, čime su, po rečima Nobelovog komiteta, „znatno proširili opseg ekonomske analize konstruisavši alate neohodne za izučavanje toga kako tržišna ekonomija dugoročno utiče na prirodu i znanje“ (Nobelprize.org, 2018). Naučni rad obojice laureata ima uporište u modelu rasta Roberta Soloua, dobitnika Nobelove nagrade za ekonomiju iz 1987. godine. I Nordhaus i Romer, svako u svom pravcu, nadograđuju ovaj model, koji nije mogao da objasni znatne i kontinuirane razlike u stopama rasta različitih zemalja. Doprinos dvojice nagrađenih profesora, međutim, ima i druge zajedničke karakteristike - obojica u svojim radovima ističu nesavršenosti tržišta i pokušavaju da podstaknu angažovanje država, prvenstveno apelujući na kreatore politika da uvedu odgovarajuće ekonomske mere, u čemu vide pravi put ka boljim rezultatima, globalnom napretku i prosperitetu. Na ovaj način, njihovo delovanje pomoglo je da se „smanje barijere ka državnim intervencijama: kada je reč o klimatskim promenama, zahvaljujući proceni troškova nereagovanja; kada je reč o inovacijama, zahvaljujući proceni benefita reagovanja“ (Appelbaum, 2018).

Ekonomskim merama ograničiti klimatske promene

Vilijam Nordhaus rođen je 1941. godine u Albukerkiju, Novi Meksiko, SAD. Diplomirao je ekonomiju 1963. godine na Jejl univerzitetu, a doktorirao 1967. godine na Masačusetskom institutu za tehnologiju, Kembridž, SAD. Te godine počeo je da radi na Jejl univerzitetu, gde je zvanje redovnog profesora ekonomije stekao 1973. godine. Njegov istraživački rad fokusira se na ekonomski rast i prirodne resurse, ekonomiju klimatskih promena, kao i uticaj ograničenih resursa na ekonomski razvoj. Profesor Nordhaus takođe je izučavao i ponašanje zarada i cena, ekonomiju zdravstva, augmentirano nacionalno računovodstvo, političke poslovne cikluse, produktivnost i „novu ekonomiju“. Autor je brojnih knjiga, od kojih se izdvajaju: *Otkrića, rast i dobrostanje, da li je rast zastarela kategorija?*, *Efikasno korišćenje energetskih resursa*, *Reformisanje savezne regulative*, *Klimatski kazino: rizik, neizvesnost i ekonomija za sve topliji svet*, itd.

Član je Nacionalne akademije nauka i Američke akademije nauka i umetnosti, kao i deo istraživačkog tima Nacionalnog biroa

Odabrani radovi Vilijama Nordhausa

1. Nordhaus, Vilijam D, 1969. “Ekonomska teorija o tehnološkim promenama”, *Američki ekonomski pregled,* Američko ekonomsko udruženje, vol. 59(2), str. 18-28.
2. Nordhaus, Vilijam D, 1980. “Energetska kriza i makroekonomska politika”, *Žurnal za energetiku*, Međunarodno udruženje za ekonomiju energetike, vol. 0 (broj 1).
3. Nordhaus, Vilijam D, 1991. “Usporiti ili ne usporiti: Ekonomija efekta zelene bašte”, *Ekonomski žurnal*, Kraljevsko ekonomsko društvo, vol. 101(407), str. 920-937.
4. Nordhaus, Vilijam D, 2007. “Ko se boji velike naftne krize još?”, *Zbornik radova o ekonomskoj aktivnosti*, Program ekonomskih studija, The Brookings Institution, vol. 38 (2), str. 219-240.
5. Nordhaus, Vilijam D, 2011. “Integrisano ekonomsko i klimatsko modeliranje”, *Zbornik radova Kaulz fondacije 1839*, Kaulz fondacija za ekonomska istraživanja, Jejl univerzitet.
6. Nordhaus, Vilijam D, 2015. “Da li idemo ka ekonomskoj singularnosti? Informacione tehnologije i budućnost ekonomskog rasta”, *Zbornik radova NBEI 21547*, Nacionalni biro za ekonomska istraživanja.
7. Nordhaus, Vilijam D, 2016. “Projekcije i neizvesnosti u pogledu klimatskih promena u eri minimalnih klimatskih propisa”, *Zbornik radova NBEI 22933*, Nacionalni biro za ekonomska istraživanja.

The Swedish Royal Academy of Sciences awarded the Nobel Prize in Economic Sciences for 2018 to two American scientists - William Nordhaus and Paul Romer, for integrating climate change, i.e. technological innovation into long-term macroeconomic analysis. In their research, they touched on some of the burning issues of sustainability of long-term economic growth, which, according to the Nobel Committee, significantly "broadened the scope of economic analysis by designing the tools that are necessary to examine how the market economy has a long-term influence on nature and knowledge" (Nobelprize.org, 2018). The scientific work of both laureates has a foothold in the growth model of Robert Solow, winner of the Nobel Prize for Economic Sciences in 1987. Both Nordhaus and Romer, each in their own way, upgraded this model, having realized that it could not explain the significant and continuous differences in the growth rates of different countries. The contributions of the two award-winning professors, however, have other common characteristics - in their work, they both point to market imperfections and try to encourage the engagement of governments, primarily urging policymakers to introduce appropriate economic measures, in which they see the right path towards better results, global progress, and prosperity. Thereby, their work has helped to "reduce the barriers to government intervention: in the case of climate change, by estimating the costs of inaction; in the case of innovation, by estimating the benefits of action" (Appelbaum, 2018).

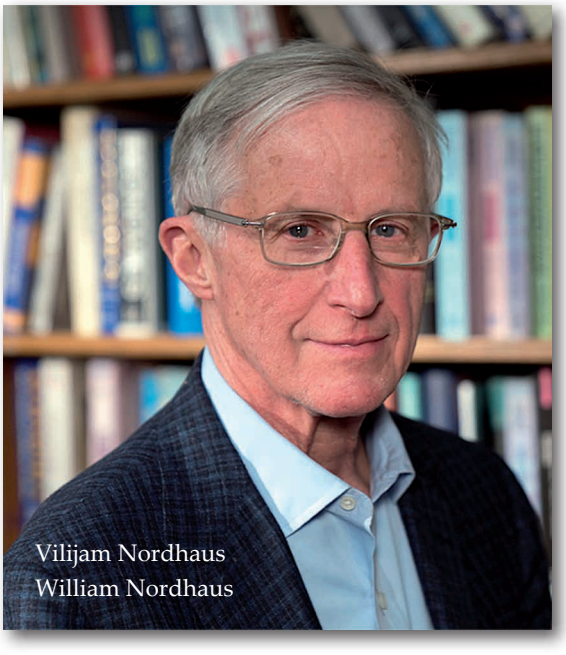
Selected Papers by William Nordhaus

1. Nordhaus, William D, 1969. "An Economic Theory of Technological Change", *American Economic Review*, American Economic Association, vol. 59(2), pages 18-28.
2. Nordhaus, William D, 1980. "The Energy Crisis and Macroeconomic Policy", *The Energy Journal*, International Association for Energy Economics, vol. 0(Number 1).
3. Nordhaus, William D, 1991. "To Slow or Not to Slow: The Economics of the Greenhouse Effect", *Economic Journal*, Royal Economic Society, vol. 101(407), pages 920-937.
4. Nordhaus, William D, 2007. "Who's Afraid of a Big Bad Oil Shock?", *Brookings Papers on Economic Activity*, Economic Studies Program, The Brookings Institution, vol. 38(2), pages 219-240.
5. Nordhaus, William D, 2011. "Integrated Economic and Climate Modeling", *Cowles Foundation Discussion Papers 1839*, Cowles Foundation for Research in Economics, Yale University.
6. Nordhaus, William D, 2015. "Are We Approaching an Economic Singularity? Information Technology and the Future of Economic Growth", *NBER Working Papers 21547*, National Bureau of Economic Research, Inc.
7. Nordhaus, William D, 2016. "Projections and Uncertainties About Climate Change in an Era of Minimal Climate Policies", *NBER Working Papers 22933*, National Bureau of Economic Research, Inc.

Economic Measures to Limit Climate Change

William Nordhaus was born in 1941, in Albuquerque, New Mexico, USA. He completed his undergraduate work at Yale University in 1963 and received his Ph.D. in Economics in 1967 from the Massachusetts Institute of Technology, Cambridge, USA. That year he joined the faculty of Yale University and has been Full Professor of Economics there since 1973. His research has focused on economic growth and natural resources, the economics of climate change, as well as the resource constraints on economic growth. Professor Nordhaus also studied wage and price behaviour, health economics, augmented national accounting, political business cycles, productivity, and "new economy". He authored many books, among them *Invention, Growth and Welfare, Is Growth Obsolete?, The Efficient Use of Energy Resources, Reforming Federal Regulation, Managing the Global Commons, Warming the World, etc.*

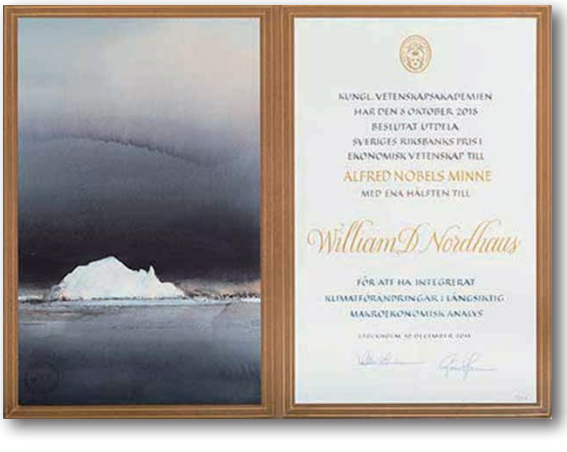
Nordhaus is a fellow of the National Academy of Sciences, a fellow of the American Academy of Arts and Sciences and a research associate of the National Bureau of Economic


Vilijam Nordhaus
William Nordhaus

za ekonomska istraživanja. Tokom svoje bogate karijere bio je i urednik nekoliko naučnih časopisa, kao i član Izvršnih odbora Američkog ekonomskog udruženja i Istočnog ekonomskog udruženja. Učestvuje u radu Panela ekonomskih stručnjaka pri kongresnoj kancelariji za budžetiranje. Bio je prvi predsedavajući Savetodavnim odborom Biroa za ekonomsku analizu, kao i novoformiranim Odborom za saveznu statistiku pri Američkom ekonomskom udruženju. Ovo udruženje mu je zbog njegovog izuzetnog doprinosa 2004. godine dodelilo titulu počasnog člana. U okviru Nacionalne akademije nauka bio je član nekoliko radnih tela, uključujući Odbor za nuklearne i alternativne energetske sisteme, Panel za implikacije globalnog zagrevanja na regulativu, Odbor za nacionalnu statistiku, Komitet za implikacije naglih klimatskih promena na nauku i društvo, itd.

Svoju uspešnu karijeru dugu više od četiri decenije Vilijam Nordhaus posvetio je izučavanju klimatskih promena i ukazivanju nadležnim vlastima na preporuke za regulativu u pogledu ograničenja emisije gasova koji izazivaju efekat staklene bašte. Počev od sedamdesetih godina prošlog veka, razvija ekonomske pristupe globalnom zagrevanju, uključujući integrisane ekonomske i naučne modele sa ciljem utvrđivanja efikasnog puta za rešavanje problema klimatskih promena. Definisavši takozvane integrisane modele ocene (*integrated assessment models - IAMs*) sredinom devedesetih godina prošlog veka, Nordhaus je došao do kvantitativnog načina da opiše dinamičku interakciju društva i prirode, odnosno međusobnu povezanost ekonomije i klimatskih promena na globalnom nivou. Postoje dve verzije ovog modela: regionalni integrisani klimatsko-ekonomski model (*Regional Integrated Climate-Economy RICE model*) koji obuhvata više odvojenih regiona i pojednostavljeni dinamični integrisani klimatsko-ekonomski model (*Dynamic Integrated Climate-Economy DICE model*) koji obuhvata samo jedan region. Njegovi modeli integrišu teoriju i empirijske rezultate iz domena fizike, hemije i ekonomije, sa osnovnom idejom da se tržišna ekonomija usmeri ka postizanju nivoa emisije štetnih gasova koji bi predstavljao ravnotežu između društvenih troškova i benefita. Drugim rečima, ka postizanju nivoa emisije koji bi bio ekonomski optimalan.

Nordhausovi modeli se danas koriste za izučavanje posledica državnih intervencija u smislu odgovarajuće regulative, prvenstveno poreza na emisiju ugljendioksida (*carbon tax*), za čije se jednoobrazno uvođenje u svim zemljama kontinuirano zalaže. Time bi, kroz odgovarajuću cenu, svaki emiter štetnih gasova kompenzovao štetu koju njegovo emitovanje nanosi životnoj sredini. Nobelov komitet i Švedska kraljevska akademija nauka su ovakvim izborom dobitnika Novelove nagrade za ekonomiju, naročito imajući u vidu trenutne političke stavove Sjedinjenih Američkih Država, poslali poruku o tome koliko je u ovoj oblasti neophodna i značajna međunarodna saradnja kako bi se rešilo pitanje od suštinske važnosti za planetu i čovečanstvo.





Vilijam Nordhaus prima Nobelovu nagradu od kralja Karla XVI Gustava od Švedske u Stokholmskoj koncertnoj dvorani, 10. decembra 2018. godine

William D. Nordhaus receiving his Prize from H.M. King Carl XVI Gustaf of Sweden at the Stockholm Concert Hall, 10 December 2018

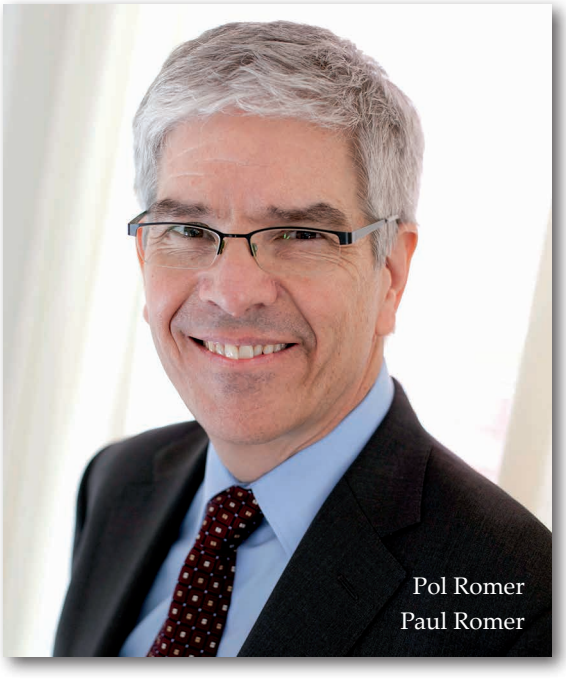
Research. During his career he has been the editor of several scientific journals, as well as a member of Executive Committees of the American Economic Association and the Eastern Economic Association. He serves on the Congressional Budget Office Panel of Economic Experts and was the first Chairman of the Advisory Committee for the Bureau of Economic Analysis, as well as the newly formed Federal Statistics Committee of the American Economic Association. Due to his exceptional contribution, this association awarded him the "Distinguished Fellow" title in 2004. Within the National Academy of Sciences, he sat on several working bodies, including the Committee on Nuclear and Alternative Energy Systems, the Panel on Policy Implications of Greenhouse Warming, the Committee on National Statistics, the Committee on the Implications for Science and Society of Abrupt Climate Change, etc.

During his successful career lasting more than four decades, William Nordhaus devoted himself to studying climate change and pointing the regulatory authorities to the recommendations for regulatory greenhouse gas emissions. Since the 1970s, he has been developing economic approaches to global warming, including integrated economic and scientific models in order to identify an effective way to tackle climate change. Defining the so-called integrated assessment models (*IAMs*) in the mid-1990s, Nordhaus came up with a quantitative way to describe the dynamic interaction of society and nature, i.e. the interconnectedness of the economy and climate change at the global level. There are two versions of this model: the Regional Integrated Climate Economy Model (RICE) that includes several separate regions and the simplified Dynamic Integrated Climate Economy Model (DICE) that includes a single region. His models integrate theory and empirical results from the fields of physics, chemistry and economics, with the basic idea that the market economy is focused on reaching a level of carbon emissions that would represent a balance between social costs and benefits, i.e. a level of carbon emissions that would be economically optimal.

Nordhaus' models are now used to study the consequences of state interventions in terms of appropriate regulations, primarily carbon tax, for whose uniform implementation he has been relentlessly advocating in all countries. This way, through the appropriate price, any emitter of harmful gases would compensate for any damage caused by its emission into the environment. In selecting these two winners of the Nobel Prize in Economic Sciences, especially bearing in mind the current political stance of the United States, the Nobel Committee and the Swedish Royal Academy of Sciences sent a message about the necessity of substantial international cooperation in this area with a view to resolving the issue of crucial importance for the planet and humanity.

Collective Welfare through Technological Changes

Paul Romer was born in 1955 in Denver, USA. He got a degree in mathematics at the University of Chicago, where in 1983, after doing graduate work at the Massachusetts Institute of Technology and Queens University, he defended a doctorate in economics


Pol Romer
Paul Romer

Tehnološkim promenama do kolektivne dobrobiti

Pol Romer rođen je 1955. godine u Denveru, SAD. Diplomirao je matematiku na Univerzitetu u Čikagu, gde je 1983. godine, nakon studija na Masačusetskom institutu za tehnologiju i Kvins univerzitetu, odbranio doktorat iz ekonomije pod nazivom „Dinamički konkurentni ekvilibrijumi sa eksternalijama, rastućim prihodima i neograničenim rastom". Danas je redovni profesor na Fakultetu za poslovne studije Stern pri Njujorškom univerzitetu, ali je pre toga predavao i na Stenford univerzitetu, Univerzitetu Kalifornije u Berkliju, Univerzitetu u Čikagu i Ročester univerzitetu. Romer je saradnik Nacionalnog biroa za ekonomska istraživanja od 1987. godine, Centra za napredne studije u oblasti bihejvioralnih nauka od 1989. godine, član Ekonometrijskog društva od 1990. godine, kao i član Izvršnog odbora Američkog ekonomskog udruženja od 1996. godine. Od 2000. godine član je Američke akademije nauka i umetnosti, dok se Centru za globalni razvoj pridružio 2010. godine. Za svoj rad na ulozi ideja u održavanju ekonomskog rasta dobio je Rektenvaldovu nagradu 2002. godine. U oktobru 2016. godine izabran je na mesto glavnog ekonomiste Svetske banke, ali se sa te pozicije povukao početkom 2018. godine, pre isteka mandata, zbog neslaganja sa metodologijom izrade *Doing Business* izveštaja i navodnog mešanja političkih uticaja u slučaju pojedinih zemalja.

Pored profesure i istraživačkog rada, Romer je i uspešan preduzetnik, pre svega kao generalni direktor Projekta urbanizacije Stern pri Njujorškom univerzitetu (*NYU Stern Urbanization Project*). U okviru ovog projekta sprovode se primenjena istraživanja na temu mnogobrojnih načina na koje kreatori politike u zemljama u razvoju mogu da iskoriste rapidni razvoj gradova kako bi stvorili ekonomske prilike i preduzeli sistemske socijalne reforme. Osim toga, Romer je i direktor Instituta za urbani menadžment Maron pri istom univerzitetu, čija je misija da produbi fundamentalno razumevanje gradova kroz rad sa građanskim inovatorima u cilju podsticanja i poboljšanja urbanog menadžmenta. Ova misija temelji se na Romerovom konceptu „gradova sa poveljom" (*charter cities*), za čije se osnivanje i razvoj širom sveta, između ostalog, zalaže.

Odabrani radovi Pola Romera

1. Romer, Pol, 1989. "Endogene tehnološke promene", *NBER Working Papers 3210*, Nacionalni biro za ekonomska istraživanja.
2. Romer, Pol, 1994. "Koreni endogenog rasta", *Časopis za ekonomske perspektive*, Američko ekonomsko udruženje, vol. 8(1), str. 3-22.
3. Romer, Pol, 2002. "Kada treba da se pozivamo na prava intelektualne svojine?", *Američki ekonomski pregled,* Američko ekonomsko udruženje, vol. 92(2), str. 213-216.
4. Romer, Pol, 2010. "Koji aspekti globalizacije su značajni za ubrzani rast?", *NBER Working Papers 15755*, Nacionalni biro za ekonomska istraživanja.
5. Romer, Pol, 2010. "Tehnologija, propisi i napredak: O slobodnim gradovima", *Working Papers id: 2471*, eSocialSciences.
6. Fuler, Brendon i Romer, Pol, 2014. "Urbanizacija kao prilika", *Policy Research Working Paper Series 6874*, Svetska banka.
7. Romer, Pol, 2015. "Matematičnost u teoriji ekonomskog rasta", *Američki ekonomski pregled*, Američko ekonomsko udruženje, vol. 105(5), str. 89-93.

titled "Dynamic Competitive Equilibria with Externalities, Increasing Returns and Unbounded Growth". Today he is a full-time professor at the Stern School of Business at New York University, but he also taught at Stanford University, University of California in Berkeley, University of Chicago and University of Rochester. Romer has been a research associate of the National Bureau of Economic Research since 1987, a fellow of the Centre for Advanced Studies in the Field of Behavioural Sciences since 1989, a fellow of the Econometric Society since 1990, and member of the Executive Council of the American Economic Association since 1996. Since 2000 he has been a fellow of the American Academy of Sciences and Arts, and a fellow of the Global Development Centre since 2010. For his work on the role ideas in sustaining economic growth he received the 2002 Recktenwald Prize. In October 2016, he was elected the World Bank's Chief Economist, but he withdrew from that position in early 2018, before the expiration of his term of office, due to disagreement with the Doing Business Report methodology and the alleged political interference in the case of some countries.

In addition to his teaching and research work, Romer is a successful entrepreneur, primarily as the founding director of the NYU Stern Urbanization Project. Under this project, applied research is undertaken on the many ways in which policymakers in developing countries can take advantage of the rapid growth of cities to create economic opportunities and undertake systemic social reforms. Professor Romer is also the director of the Marron Institute of Urban Management at the same university, whose mission is to deepen the fundamental understanding of cities through work with civic innovators to encourage and improve urban management. This mission is based on Romer's concept of "charter cities", the founding and development of which around the world is, among other things, something he advocates.

In his research, Paul Romer raised the question of how the accumulation of ideas enables sustainable long-term economic growth. Previous macroeconomic research highlighted technological innovation as the primary driver of economic development, but did not explain how economic decisions and market conditions influence the creation of new technologies. Romer solved this problem in the 1990s by setting the basics of his own endogenous growth theory. According to this theory, which is both conceptual and practical, technological progress is not exogenous and does not enter the economy from external sources, but is generated by purposeful market activities, therefore, endogenously. Romer further explains what is specific to the economic growth of ideas, primarily because ideas represent goods that do not have the characteristics of rivalry or exclusiveness and, therefore, require specific conditions to survive on the market. Although science was previously already perceived as a public good, Romer unambiguously identified it as a driver of economic growth and prosperity.

Selected Papers by Paul Romer

1. Romer, Paul, 1989. "Endogenous Technological Change", *NBER Working Papers 3210*, National Bureau of Economic Research, Inc.
2. Romer, Paul, 1994. "The Origins of Endogenous Growth", *Journal of Economic Perspectives*, American Economic Association, vol. 8(1), pages 3-22.
3. Romer, Paul, 2002. "When Should We Use Intellectual Property Rights?", *American Economic Review*, American Economic Association, vol. 92(2), pages 213-216.
4. Romer, Paul, 2010. "Which Parts of Globalization Matter for Catch-up Growth?", *NBER Working Papers 15755*, National Bureau of Economic Research, Inc.
5. Romer, Paul, 2010. "Technologies, Rules, and Progress: The Case for Charter Cities", *Working Papers id: 2471*, eSocialSciences.
6. Fuller, Brandon & Romer, Paul, 2014. "Urbanization as Opportunity", *Policy Research Working Paper Series 6874*, The World Bank.
7. Romer, Paul, 2015. "Mathiness in the Theory of Economic Growth", *American Economic Review*, American Economic Association, vol. 105(5), pages 89-93.



Pol Romer je u svojim istraživanjima počeo od pitanja na koji način akumulacija ideja omogućava održiv dugoročni ekonomski rast. Prethodna makroekonomska istraživanja označila su tehnološke inovacije kao primarni pokretač ekonomskog razvoja, ali nisu objasnila kako ekonomske odluke i tržišni uslovi utiču na kreiranje novih tehnologija. Romer je ovaj problem rešio devedesetih godina prošlog veka postavivši osnove svoje teorija endogenog rasta (*endogenous growth theory*). Prema ovoj teoriji, koja je i konceptualna i praktična, tehnološki napredak nije egzogen i ne ulazi u ekonomiju iz spoljnih izvora, već se generiše putem ciljanih aktivnosti na tržištu, dakle, endogeno. Romer dalje objašnjava šta je specifično za ekonomski rast koga pokreću ideje, pre svega zbog toga što ideje predstavljaju dobro koje nema svojstva rivaliteta ni isključivosti i što, samim tim, zahtevaju specifične uslove kako bi opstale na tržištu. Mada je nauka i ranije bila percipirana kao javno dobro, Romer ju je nedvosmisleno označio kao pokretača ekonomskog rasta i prosperiteta. Štaviše, povukavši paralelu između tehnološkog razvoja u razvijenim zemljama i zemljama u razvoju, Romer je došao do zaključka da je na neregulisanim tržištima neophodno obezbediti dobro osmišljene državne intervencije u formi subvencija naučno-istraživačkim projektima i regulative u oblasti patenata i zaštite intelektualne svojine.

Životno delo za koje je nagrađen svodi se na to da „nove ideje rođene kroz tehnologiju, ohrabrene patentima i podstaknute zdravom konkurencijom, mogu biti nosilac održivog, dugoročnog ekonomskog rasta“ (Grgas, 2018), a ujedno nam pomoći prilikom osnivanja institucija i kreiranja politika koje mogu da poboljšaju prosperitet čovečanstva ukazujući nam na odgovarajuće uslove koje treba podsticati u cilju tehnološkog razvoja.

***

Uprkos tome što nema konačnih odgovora na pitanja koja su Nordhaus i Romer postavili, kao ni osnova za preterani optimizam kada je reč o rešavanju i regulisanju problema globalnog zagrevanja, ova dvojica naučnika definisali su fundamentalne aspekte na putu napretka u pogledu održivog globalnog ekonomskog rasta, ali i ključne korake u bavljenju nekim od centralnih tema za budućnost čovečanstva.

Literatura / References

1. Appelbaum B. (2018), 2018 Nobel in Economics Is Awarded to William Nordhaus and Paul Romer, *The New York Times*, <https://www.nytimes.com/2018/10/08/business/economic-science-nobel-prize.html>, pristupljeno 15.12.2018.
2. Grgas, G. (2018), Teorija ekonomista Paula Romera zapravo je savjet kako da postanemo bogati i živimo bolje, *Novac.hr*, <https://novac.jutarnji.hr/aktualno/teorija-ekonomista-paula-romera-zapravo-je-savjet-kako-da-postanemo-bogati-i-zivimo-bolje/7923604/>, pristupljeno 15.12.2018.
3. N/A, (2018), Paul Romer and William Nordhaus Win the Economics Nobel, *The Economist*, <https://www.economist.com/finance-and-economics/2018/10/13/paul-romer-and-william-nordhaus-win-the-economics-nobel>, pristupljeno 15.12.2018.
4. N/A, (2018), Popular Science Background: Integrating Nature and Knowledge into Economics, *NobelPrize.org*. <https://www.nobelprize.org/uploads/2018/10/popular-economicsciencesprize2018.pdf>, pristupljeno 15.12.2018.



Pol Romer prima Nobelovu nagradu od kralja Karla XVI Gustava od Švedske u Stokholmskoj koncertnoj dvorani, 10. decembra 2018. godine

Paul M. Romer receiving his Prize from H.M. King Carl XVI Gustaf of Sweden at the Stockholm Concert Hall, 10 December 2018

Moreover, having drawn the parallel between technological developments in developed and developing countries, Romer came to the conclusion that in unregulated markets it is necessary to provide well-designed state interventions in the form of R&D subsidies and regulations concerning patents and intellectual property protection.

The life's work for which he was awarded boils down to the conclusion that "new ideas born through technology, encouraged by patents and encouraged by healthy competition, can be a bearer of sustainable, long-term economic growth" (Grgas, 2018), and at the same time help us create institutions and policies which can improve the prosperity of mankind by pointing to the appropriate conditions that need to be stimulated for the purpose of technological development.

***

Despite the fact that there are no final answers to the questions raised by Nordhaus and Romer, nor is there any basis for too much optimism when it comes to resolving and regulating the issue of global warming, these two scientists have defined the fundamental aspects on the path to progress in terms of sustainable global economic growth, as well as the key steps in dealing with some of the central themes for the future of mankind.

5. N/A, (2018), Press release: The Prize in Economic Sciences 2018. NobelPrize.org. <https://www.nobelprize.org/prizes/economic-sciences/2018/press-release/>, pristupljeno 15.12.2018.
6. Nordhaus D. W. (2018), Banquet Speech. *NobelPrize.org*. <https://www.nobelprize.org/prizes/economic-sciences/2018/nordhaus/interview/>, pristupljeno 15.12.2018.
7. Nordhaus D. W. (2018), Biography. *NobelPrize.org*. <https://economics.yale.edu/people/william-d-nordhaus>, pristupljeno 15.12.2018.
8. Nordhaus D. W. (2018), Photo gallery. NobelPrize.org. Nobel Media AB 2019. <https://www.nobelprize.org/prizes/economic-sciences/2018/nordhaus/photo-gallery/>, pristupljeno 15.12.2018.
9. Romer M. P. (2018), Biography. <http://www.stern.nyu.edu/faculty/bio/paul-romer>, pristupljeno 15.12.2018.
10. Romer M. P. (2018), Photo gallery. NobelPrize.org. Nobel Media AB 2019. <https://www.nobelprize.org/prizes/economic-sciences/2018/romer/photo-gallery/>, pristupljeno 15.12.2018.