CATÓLICA
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LISBON
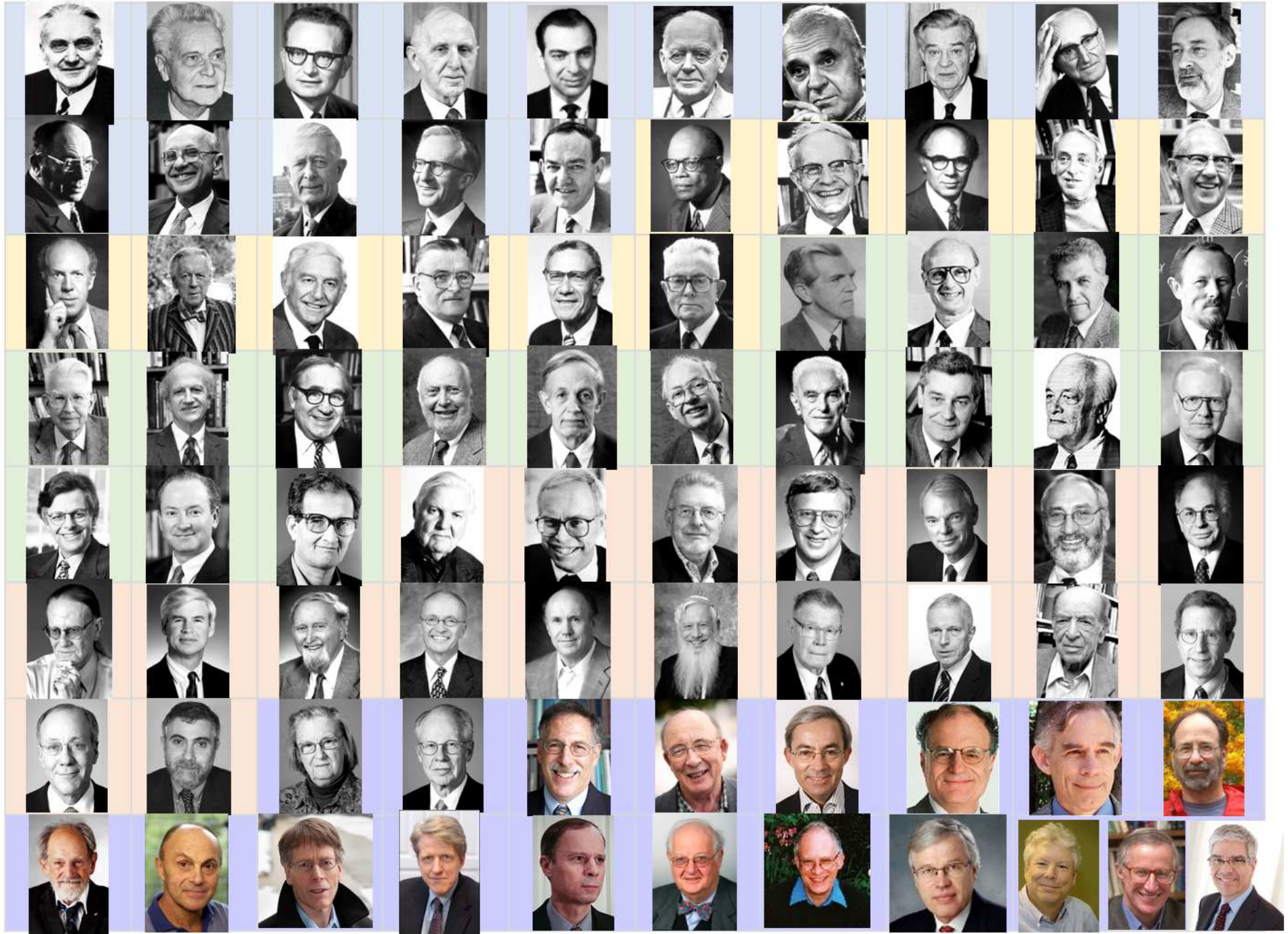BVSINESS & ECONOMICS

ARROW WORKSHOP SERIES SEMINAR IN POLITICAL SCIENCE, ECONOMICS AND MANAGEMENT

Nobel 2019 Explainer

The role of experiments to fight poverty: lessons for economists, political scientists and entrepreneurs

João César das Neves

Alfred Nobel and his testament
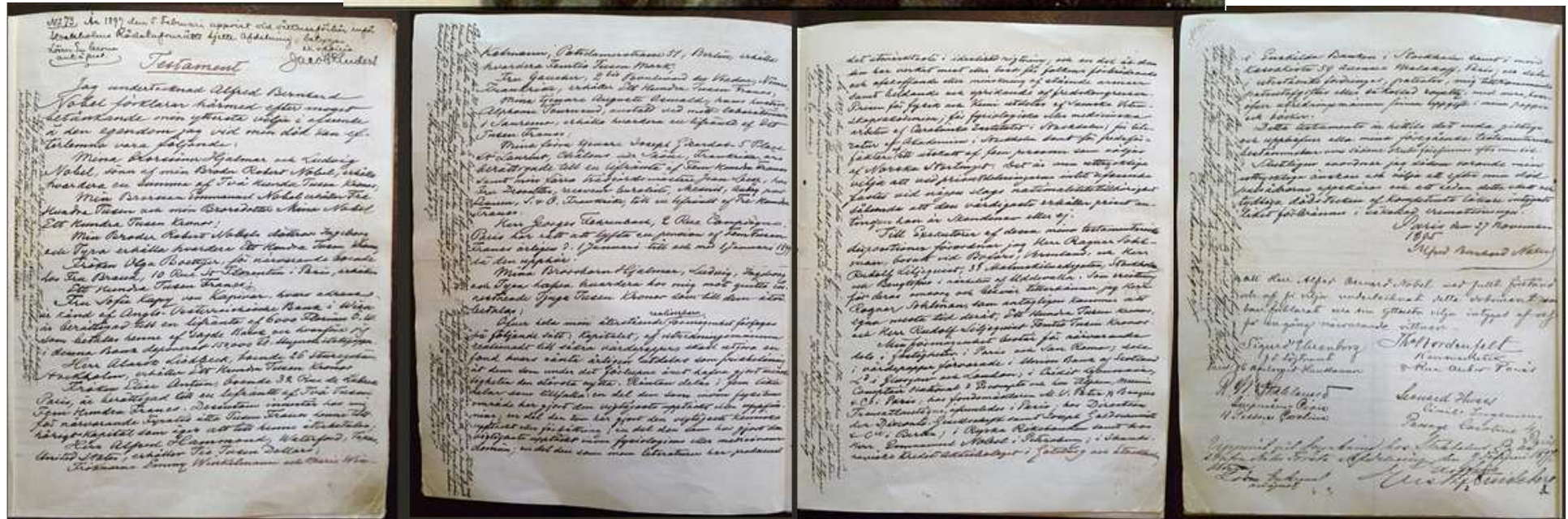
Alfred Bernhard Nobel
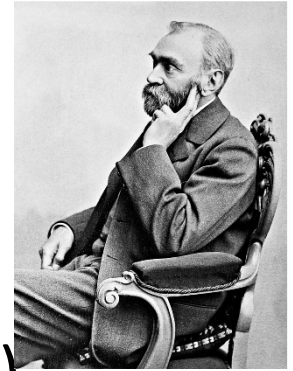
- born October 21th, 1833 in Stockolm
- Following his father, Immanuel Nobel (1801–1872) inventor and engineer, dedicated himself to chemistry
- in 1867 invented **dynamite** and in 1875 a **gelignite**, making safe the use of the explosive power of nitroglycerine, which made him a millionaire.
- When his brother Ludvig died in 1888, several newspapers published his obituary mistake. One of them use the title: "The merchant of death died". This led him to find ways to improve his reputation.
- Alfred Nobel died on December 10th, 1896
- The Nobel Foundation was created on June 29th 1900 and the first Nobel prizes awarded at December 10th 1901, the fifth anniversary of the death of the founder.

Last will and testament of Alfred Nobel

I, the undersigned, Alfred Bernhard Nobel, after mature deliberation, hereby declare the following to be my last will and testament with regard to such property as I may leave upon my death:

(…)

All of my remaining realisable assets are to be disbursed as follows: the capital, converted to safe securities by my executors, is to constitute a fund, the interest on which is to be distributed annually as **prizes to those who, during the preceding** year, have conferred the greatest benefit to humankind. The interest is to be divided into five equal parts and distributed as follows:

- one part to the person who made the most important discovery or invention in the field of **physics**;

- one part to the person who made the most important **chemical** discovery or improvement;

- one part to the person who made the most important discovery within the domain of **physiology or medicine**;

- one part to the person who, in the field of **literature**, produced the most outstanding work in an idealistic direction;

- and one part to the person who has done the most or best to advance **fellowship among nations**, the abolition or reduction of standing armies, and the establishment and promotion of **peace** congresses.

The prizes for physics and chemistry are to be awarded by the **Swedish Academy of Sciences**; that for physiological or medical achievements by the **Karolinska Institute in Stockholm**; that for literature by the **Academy in Stockholm**; and that for champions of peace by a committee of five persons to be selected by the **Norwegian Storting**. It is my express wish that when awarding the prizes, no consideration be given to nationality, but that the prize be awarded to the worthiest person, whether or not they are Scandinavian."

(...)

Paris, November 27, 1895

Alfred Bernhard Nobel

The medal for Physics and Chemistry represents Nature, in the form of godess Isis, seated in the clouds with a cornucopia

Inventas vitam iuvat excoluisse per artes

Those who improve life through arts cf. Virgil *Aeneid*, 6, 663

The medal for Physiology and Medicine represents the genius of Medicine holding an open book and collecting water for a sick girl

Inventas vitam iuvat excoluisse per artes ⟶

Medal for Literature with a young under a laurel writing the song of the Muse

Inventas vitam iuvat excoluisse per artes

The medal for Peace represents three young forming the fraternal bond

Pro pace et fraternitate gentium

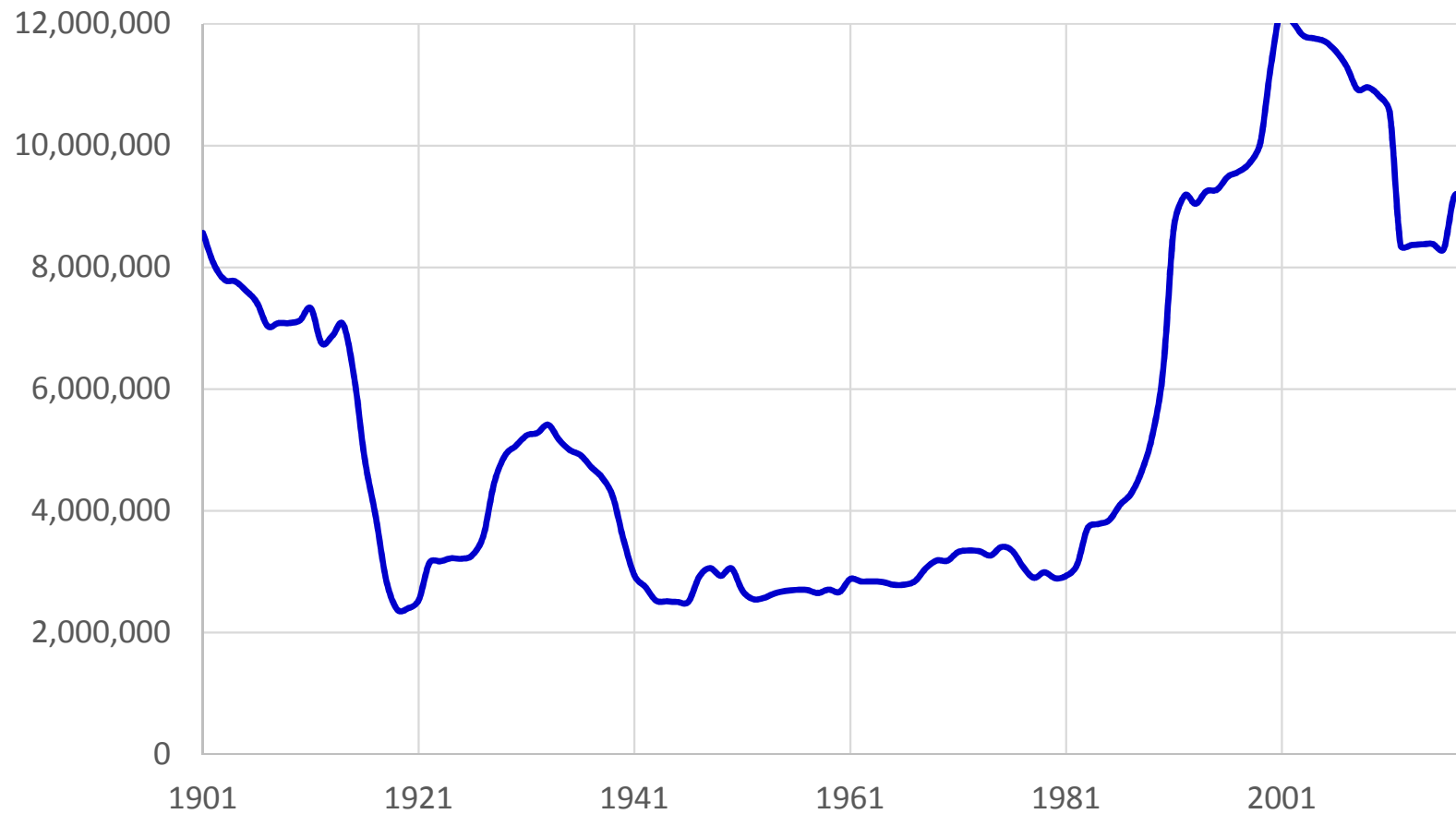Nobel Prizes per year
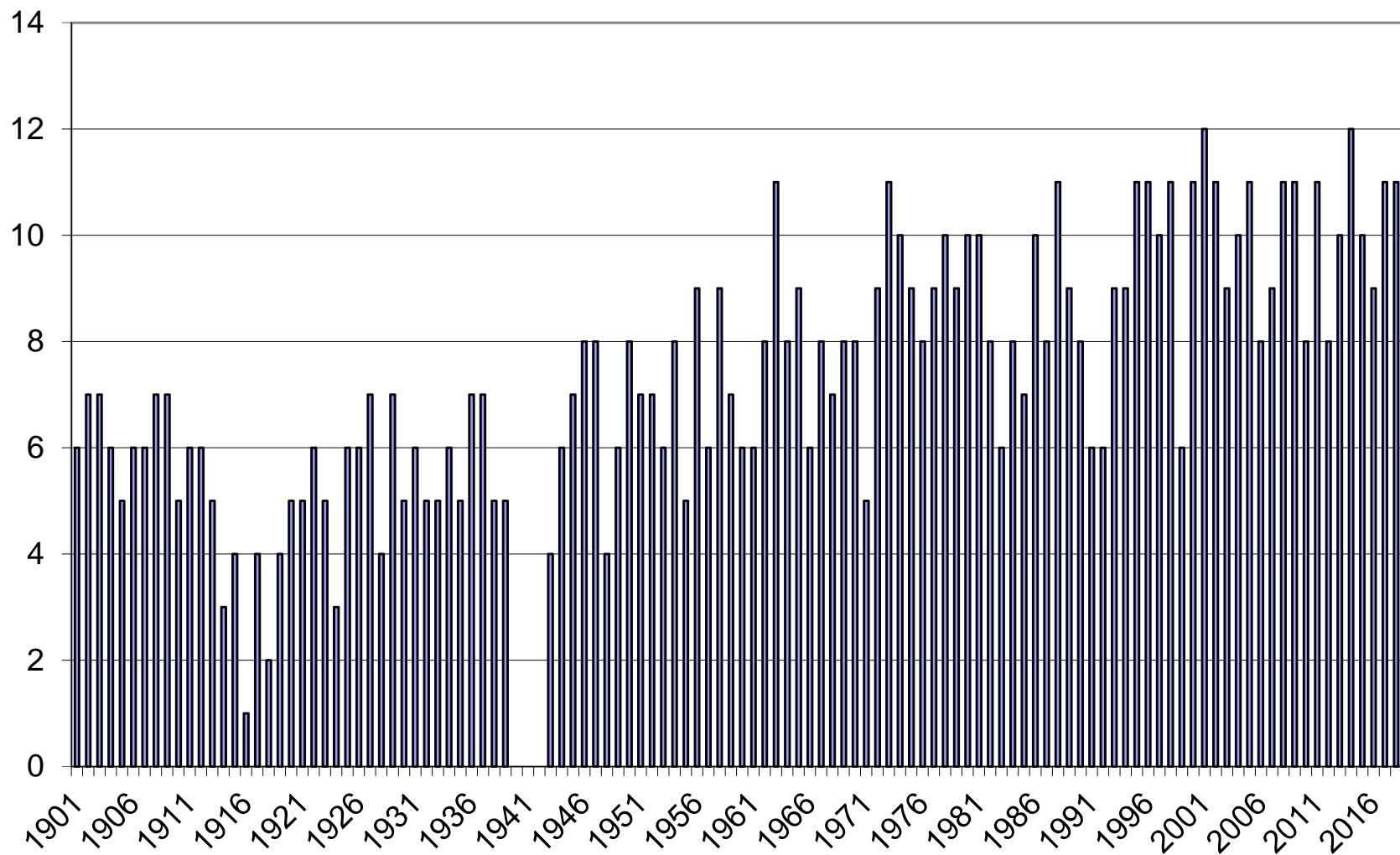
Prizes granted per year
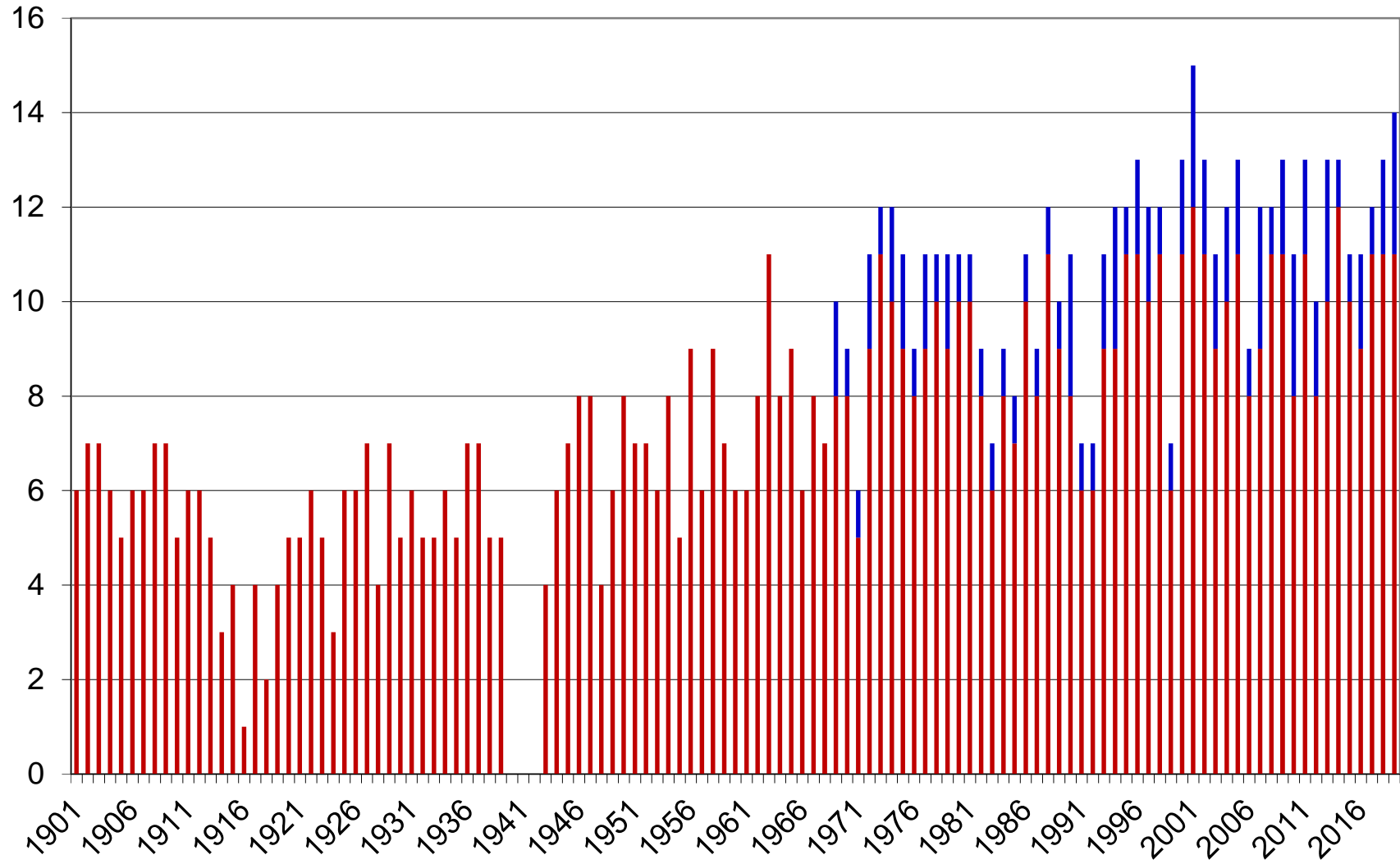
Scientific Prizes per countries
(Physics, Chemistry and Medicine)

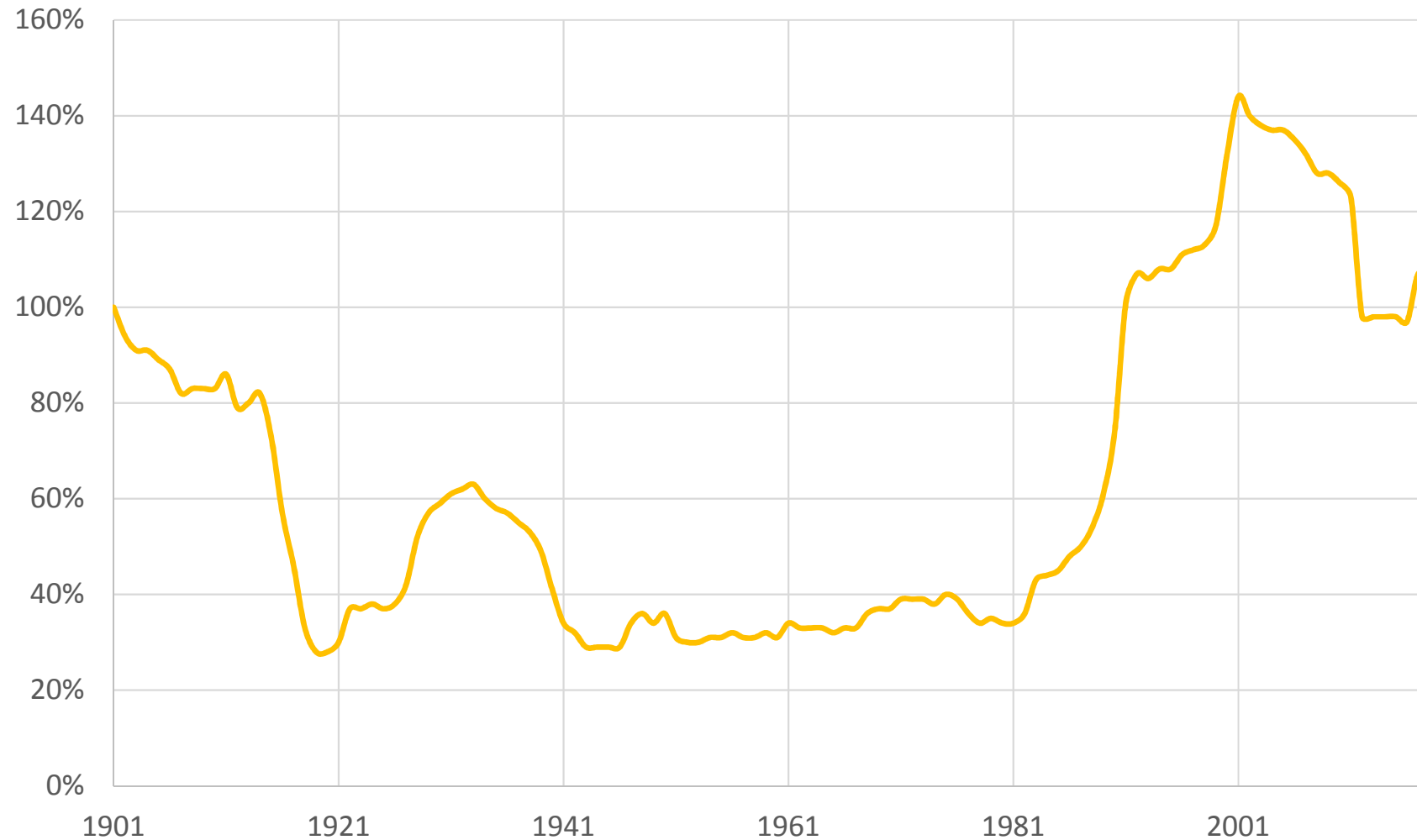| Total		616	%
USA		267	43.3
UK		92	14.9
Germany		70	11.4
France		32	5.2
Japan		15	2.4
USSR/Russia		19	3.1
Outhers		121	19.6

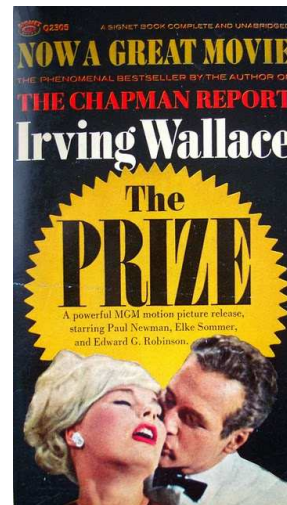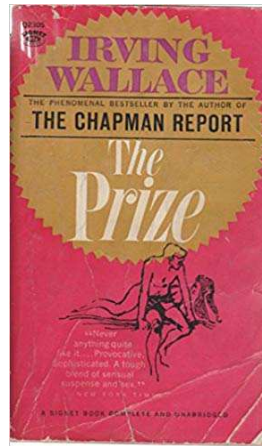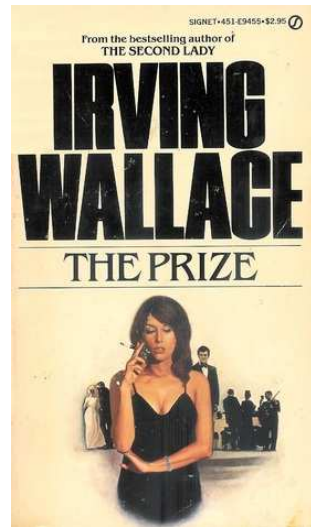# Value of the individual prize
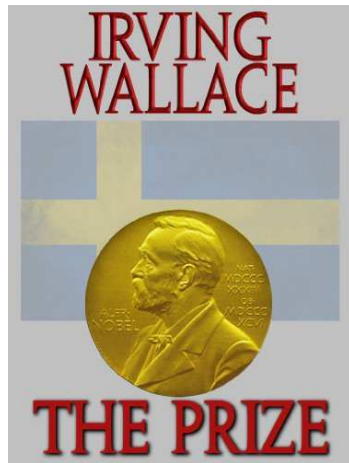## (Swedish crowns)
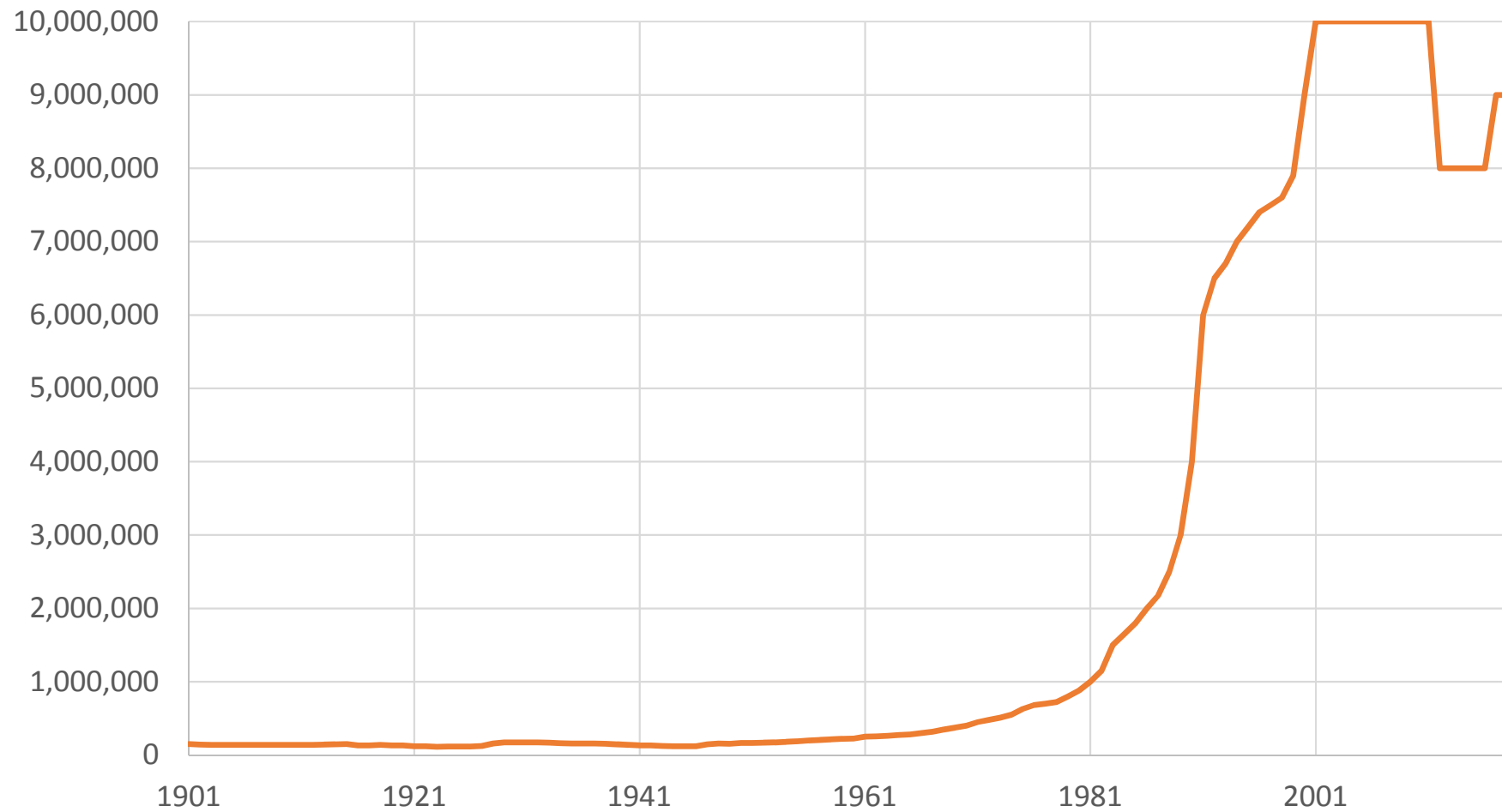
Value of the individual prize
(Swedish crowns, 2018 prices)

Value of the individual prize
(% of the initial 1901 level)

Irving Wallace (1962) *The Prize*

Irving Wallace (1916 –1990)

The Prize by Mark Robson (1963) with Paul Newman, Elke Sommer and Edward G. Robinson.

Sveriges riksbanks pris i ekonomisk vetenskap till Alfred Nobels minne


Front   Back

The medal of Economic Sciences represents the Northern star, symbol of the Academy
Sveriges Riksbank till Alfred Nobels Minne 1968

Sveriges Riksbank

- The **Sveriges Riksbank** is the world oldest central bank and the third oldest bank in operation (after *Banca Monte dei Paschi di Siena* (1472) and *Berenberg Bank* (1590) in Hamburg)

- In 1968, celebrating its 300th anniversary, created a fund "in perpetuity" to pay the administrative costs and the value of a new prize to be attributed by the Nobel Foundation

- This is not a Nobel prize
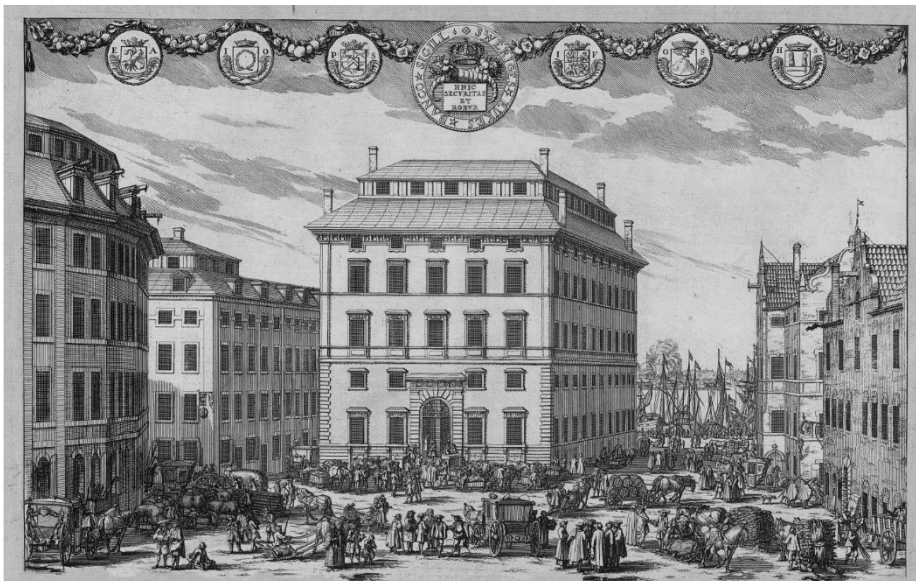
Statutes for The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel approved by the Crown on the 19th day of December 1968

§ 1 The Prize shall be awarded in accordance with the rules set forth in a deed of gift drawn up by Sveriges Riksbank on 6 June 1968, which, insofar as the present matter is concerned, reads as follows:

"In celebration of the Tercentenary of Sveriges Riksbank, the Bank has instituted a prize in economic sciences in memory of Alfred Nobel.

The prize shall be awarded annually to a person who has written a work on economic sciences of the eminent significance expressed in the will of Alfred Nobel drawn up on 27 November 1895.

The prize shall be awarded by the Royal Academy of Sciences in accordance with the rules governing the award of the Nobel Prizes instituted through his will."
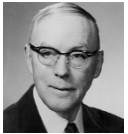
Nobel Committee

Chairman

Bertil Ohlin, 1969–1974

Erik F. Lundberg, 1975–1979

Assar Lindbeck, 1980–1994

Lars E. Svensson, 1999–2002

Torsten Persson, 2003–2004

Jörgen Weibull, 2004–2007

Bertil Holmlund, 2008

Per Strömberg, present

Secretary

Ragnar Bentzel, 1969–1985

Lars Werin, 1981

Karl-Göran Mäler, 1986–1987

Lars E. O. Svensson, 1991–1992

Torsten Persson, 1993–2001

Peter Englund, 2002—2013

Torsten Persson, 2014–

Proposals to the Nobel Prize

- The right to submit proposals for the Prize in Economic Sciences

1. Swedish and foreign members of the Royal Academy of Sciences;

2. Members of the Prize Committee for the Prize;

3. Persons who have been awarded the Prize;

4. Permanent professors in relevant subjects at the universities and colleges in Sweden, Denmark, Finland, Iceland and Norway;

5. Holders of corresponding chairs in at least six universities or colleges, selected by the Academy of Sciences

6. Other scientists from whom the Academy may see fit to invite proposals.

Process of choice

Nobel diplomas

Kungliga Svenska Vetenskapsakademien har den 12 oktober 2009 beslutat utdela det av SVERIGES RIKSBANK år 1968 instiftade priset i EKONOMISK VETENSKAP till ALFRED NOBELS MINNE till

Oliver E Williamson

för hans analys av ekonomisk organisation, särskilt företagets gränser.
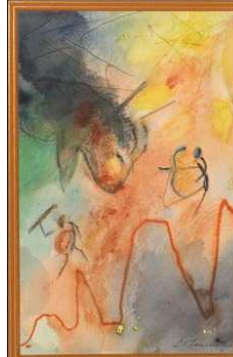
STOCKHOLM DEN 10 DECEMBER 2009

Kungliga Svenska Vetenskapsakademien har den 12 oktober 2009 beslutat utdela det av SVERIGES RIKSBANK år 1968 instiftade priset i EKONOMISK VETENSKAP till ALFRED NOBELS MINNE till

Elinor Ostrom

för hennes analys av ekonomisk organisering, särskilt samfälligheter.
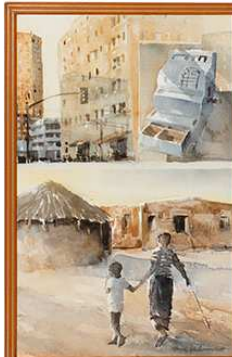
STOCKHOLM DEN 10 DECEMBER 2009

Kungliga Svenska Vetenskapsakademien har den 11 oktober 2010 beslutat utdela det av SVERIGES RIKSBANK år 1968 instiftade priset i EKONOMISK VETENSKAP till ALFRED NOBELS MINNE gemensamt till

Dale T. Mortensen

Peter A Diamond och Christopher A Pissarides för deras analys av marknader med sökfriktioner.

STOCKHOLM DEN 10 DECEMBER 2010

Svenska Vetenskapsakademien har den 10 oktober 2011 beslutat utdela det av SVERIGES RIKSBANK år 1968 instiftade priset i EKONOMISK VETENSKAP till ALFRED NOBELS MINNE gemensamt till

Thomas J Sargent

och Christopher A Sims för deras empiriska forskning om orsak och verkan i makroekonomin.

STOCKHOLM DEN 10 DECEMBER 2011

Kungliga Svenska Vetenskapsakademien har den 15 oktober 2012 beslutat utdela det av SVERIGES RIKSBANK år 1968 instiftade priset i EKONOMISK VETENSKAP och ALFRED NOBELS MINNE gemensamt till

Lloyd S Shapley

och Alvin E Roth för teorin om stabila allokeringar och för utformning av marknadsinstitutioner i praktiken.

STOCKHOLM DEN 10 DECEMBER 2012

Kungliga Svenska Vetenskapsakademien har den 14 oktober 2013 beslutat utdela det av SVERIGES RIKSBANK år 1968 instiftade priset i EKONOMISK VETENSKAP till ALFRED NOBELS MINNE gemensamt till

Eugene F Fama

Lars Peter Hansen och Robert J Shiller för deras empiriska analys av tillgångspriser.

STOCKHOLM DEN 10 DECEMBER 2013

Kungliga Svenska Vetenskapsakademien har den 14 oktober 2013 beslutat utdela det av SVERIGES RIKSBANK år 1968 instiftade priset i EKONOMISK VETENSKAP till ALFRED NOBELS MINNE gemensamt till

Lars Peter Hansen

Eugene F Fama och Robert J Shiller för deras empiriska analys av tillgångspriser.

STOCKHOLM DEN 10 DECEMBER 2013

Kungliga Svenska Vetenskapsakademien har den 14 oktober 2013 beslutat utdela det av SVERIGES RIKSBANK år 1968 instiftade priset i EKONOMISK VETENSKAP till ALFRED NOBELS MINNE gemensamt till

Robert J Shiller

Eugene F Fama och Lars Peter Hansen för deras empiriska analys av tillgångspriser.

STOCKHOLM DEN 10 DECEMBER 2013

Kungliga Svenska Vetenskapsakademien har den 13 oktober 2014 beslutat utdela det av SVERIGES RIKSBANK år 1968 instiftade priset i EKONOMISK VETENSKAP till ALFRED NOBELS MINNE till

Jean Tirole

för hans analys av marknadsmakt och reglering.

STOCKHOLM DEN 10 DECEMBER 2014

Kungliga Svenska Vetenskapsakademien har den 12 oktober 2015 beslutat utdela det av SVERIGES RIKSBANK år 1968 instiftade priset i EKONOMISK VETENSKAP till ALFRED NOBELS MINNE till

Angus Deaton

för hans analys av konsumtion, fattigdom och välfärd.

STOCKHOLM DEN 10 DECEMBER 2015

Kungliga Svenska Vetenskapsakademien har den 10 oktober 2016 beslutat utdela det av SVERIGES RIKSBANK år 1968 instiftade priset i EKONOMISK VETENSKAP TILL ALFRED NOBELS MINNE gemensamt till

Bengt Holmström

och Oliver Hart för deras bidrag till kontraktsteorin.

STOCKHOLM DEN 10 DECEMBER 2016

Kungliga Svenska Vetenskapsakademien har den 10 oktober 2016 beslutat utdela det av SVERIGES RIKSBANK år 1968 instiftade priset i EKONOMISK VETENSKAP TILL ALFRED NOBELS MINNE gemensamt till

Oliver Hart

och Bengt Holmström för deras bidrag till kontraktsteorin.
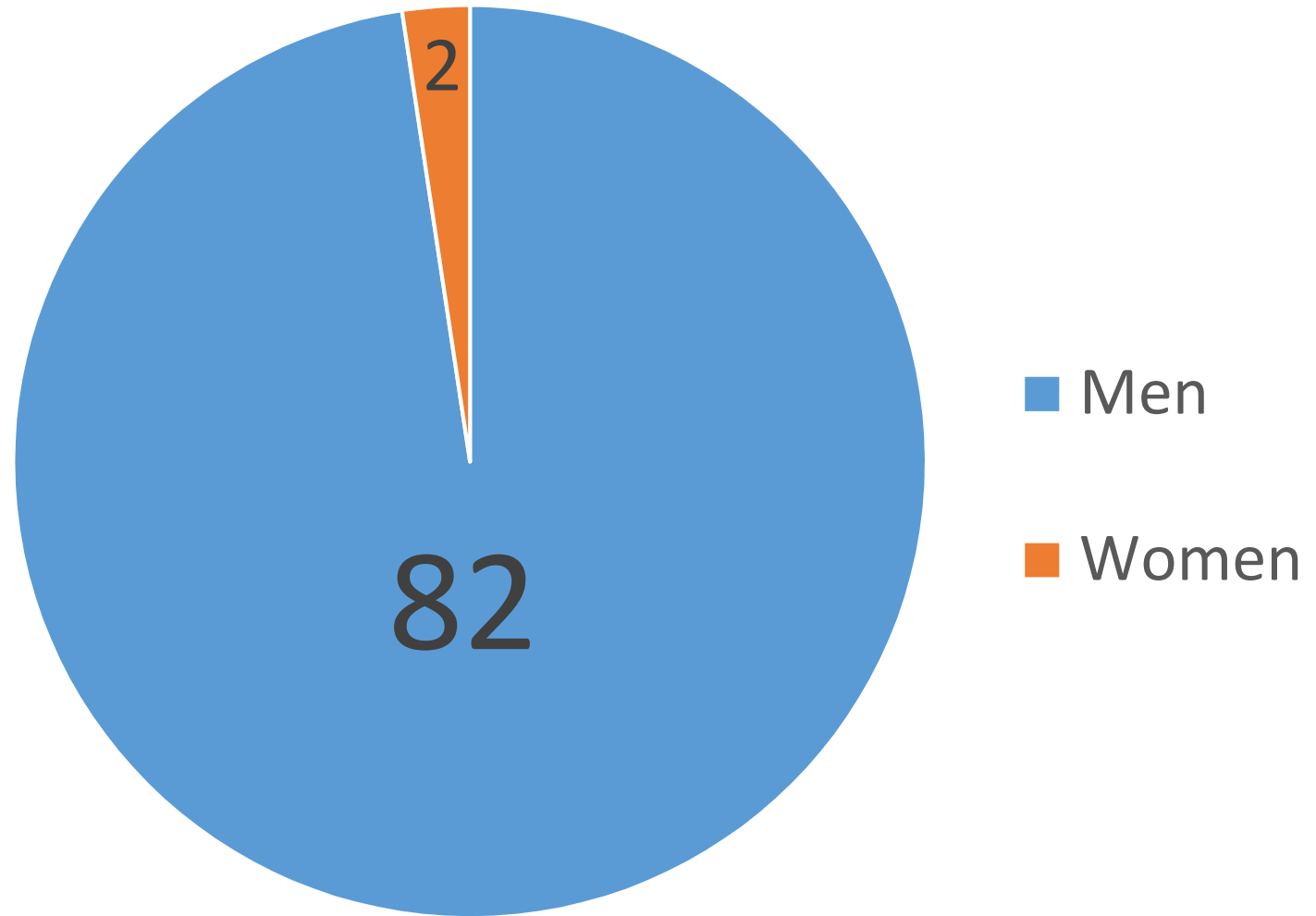
STOCKHOLM DEN 10 DECEMBER 2016

KUNGL. VETENSKAPSAKADEMIEN HAR DEN 9 OKTOBER 2017 BESLUTAT UTDELA DET AV SVERIGES RIKSBANK ÅR 1968 INSTIFTADE PRISET I EKONOMISK VETENSKAP TILL ALFRED NOBELS MINNE TILL
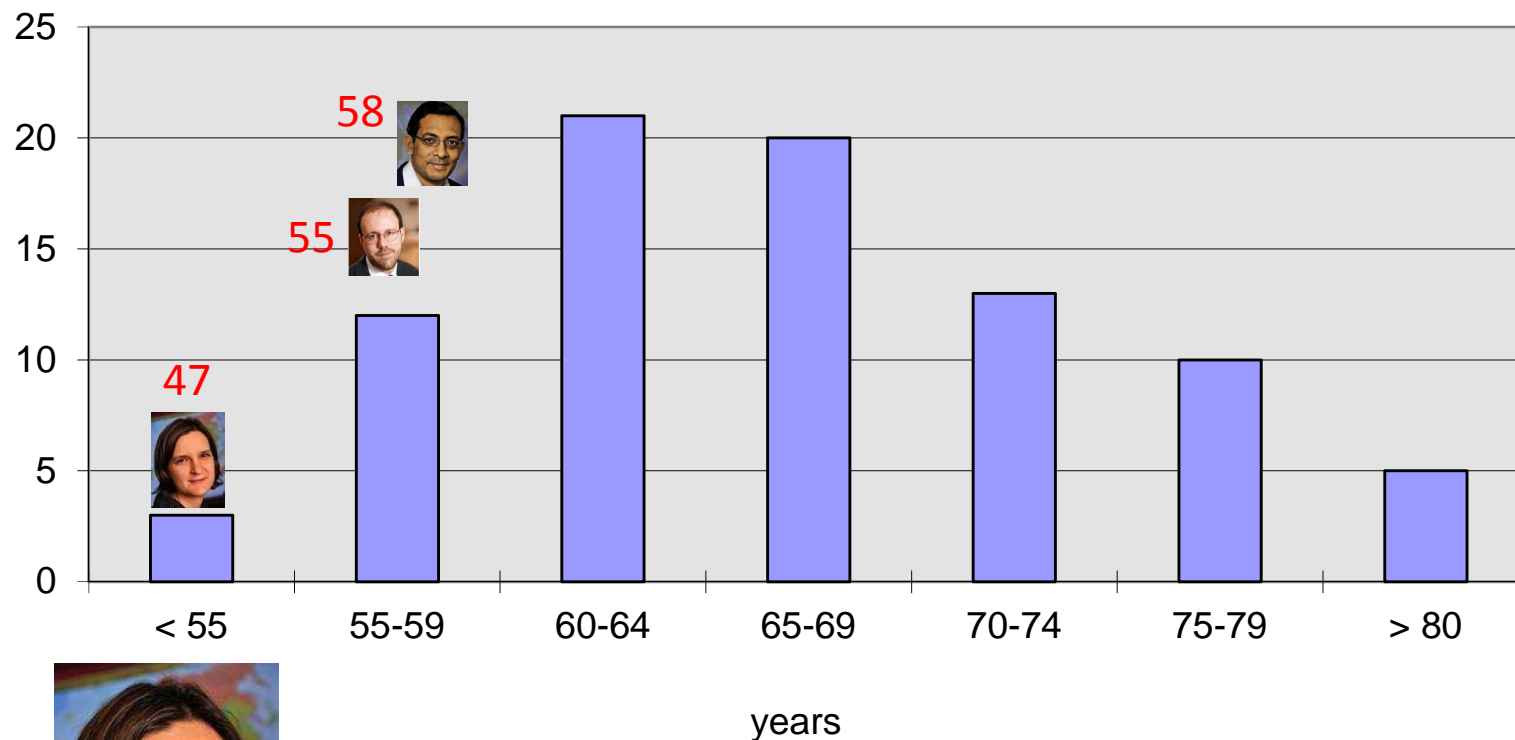
Richard H. Thaler

FÖR HANS BIDRAG TILL BETEENDEEKONOMI.
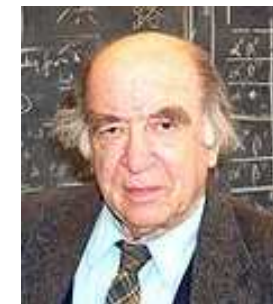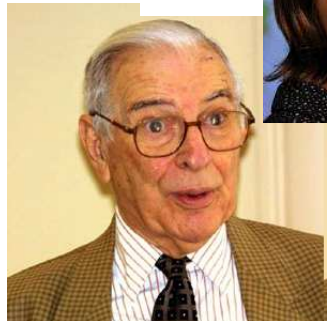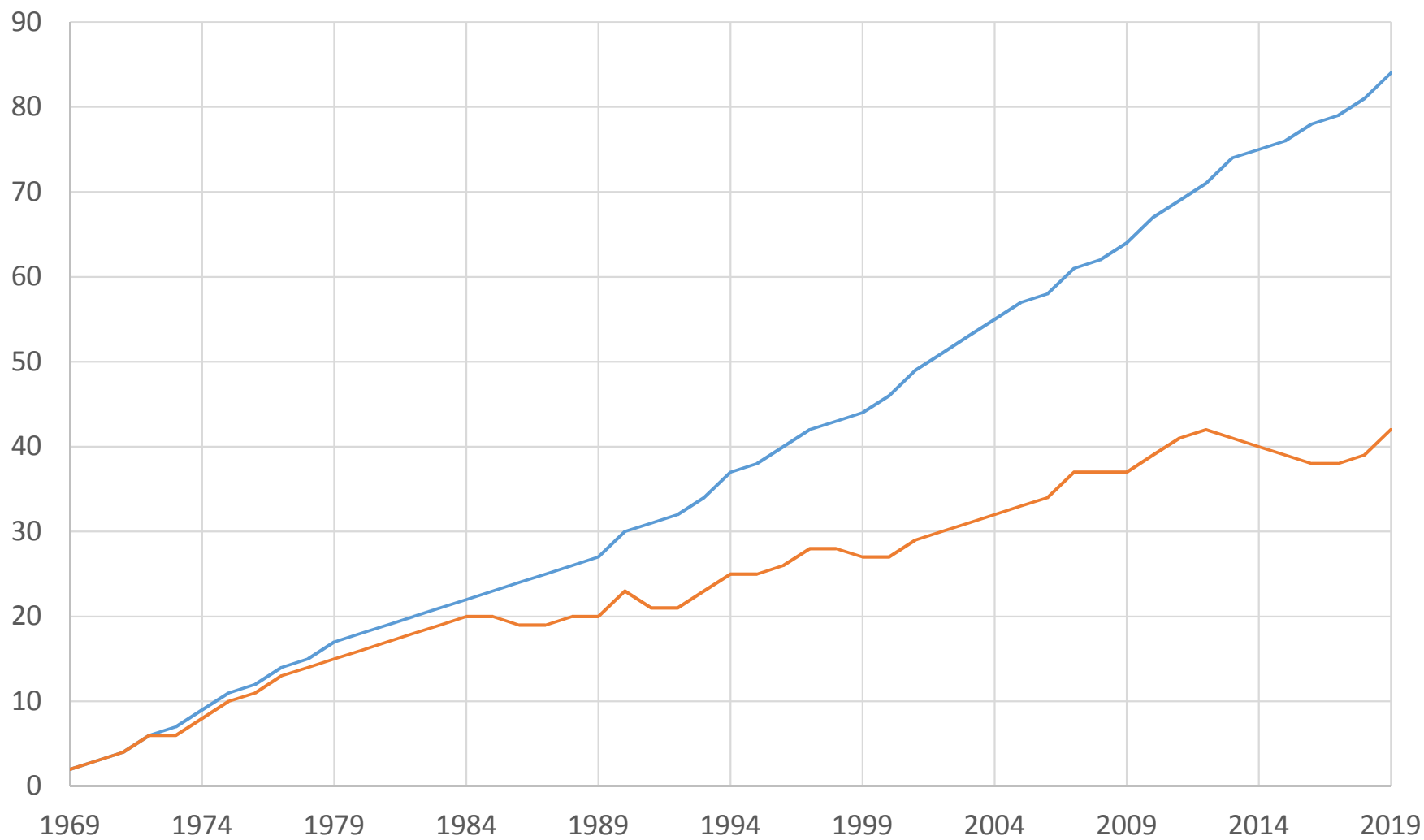
STOCKHOLM DEN 10 DECEMBER 2017

Sex of the laureates

Age of the laureates

Youngest (47) in 2019 – Esther Duflo

Youngest (51) in 1972 - Kenneth Arrow

Oldest (90) in 2007 - Leonid Hurwicz

Number of laureates
(total and living)

		Birth	Formation	Teaching
Finland		1	0	0
Cyprus		1	0	0
Santa Lucia		1	0	0
India		2	0	0
Hungary		1	0	0
Canada		3	0	0
Italy		1	0	0
Israel		1	0	1
UK		8	10	7
USA		47	63	66
Germany		2	2	1
Russia		4	1	1
Norway		3	1	2
Holland		2	2	1
France		4	2	2
Austria		1	1	1
Sweden		2	2	2
Poland		0	1	0

Birth country of the laureates
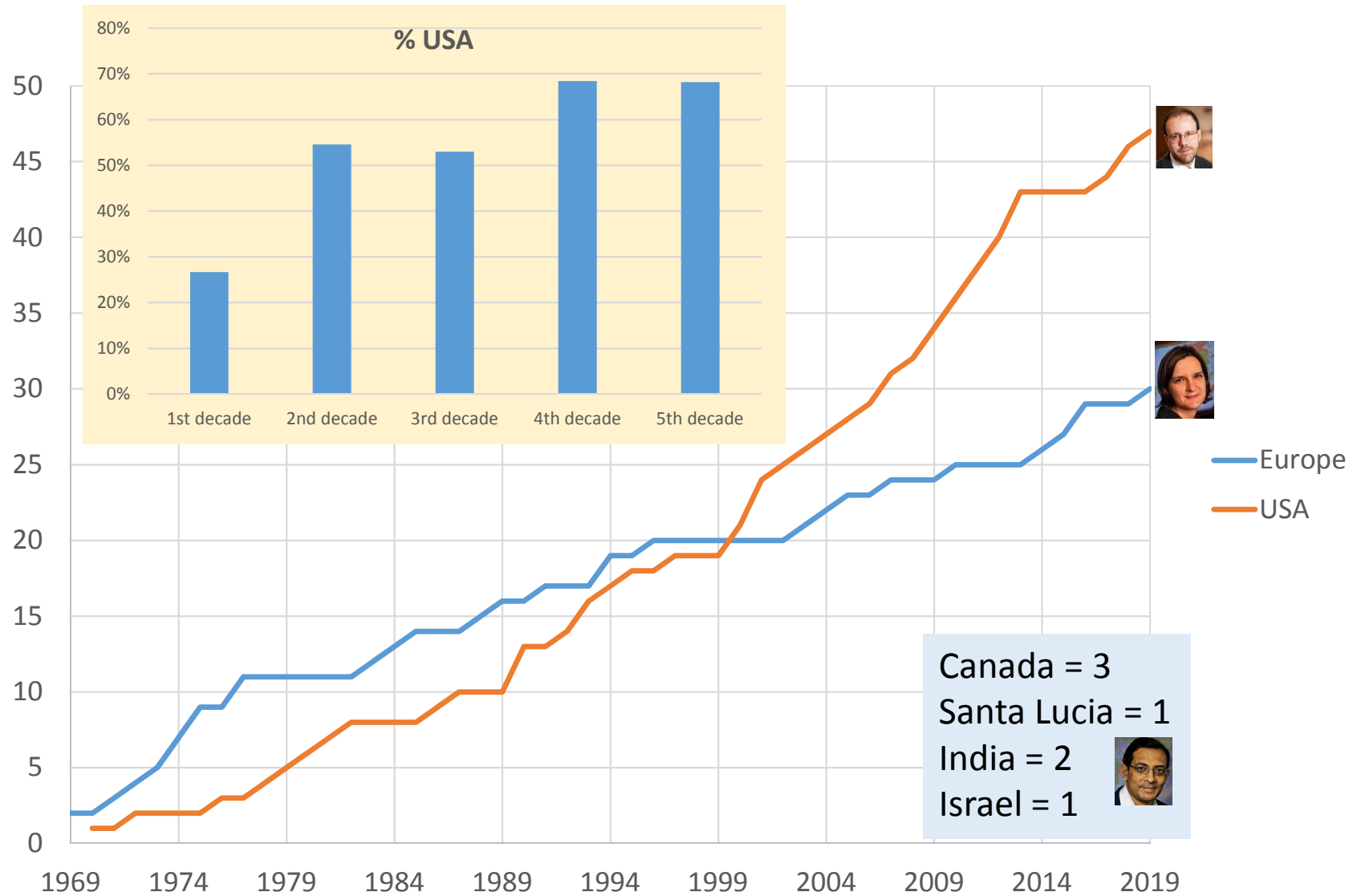
Countries of the schools

		# Univ.	Prizes	
			Formation	Teaching
USA		28	62	66
Great-Britain		4	10	7
Germany		3	2	1
France		2	2	2
Holland		2	2	1
Austria		2	1	1
Russia		2	1	1
Sweden		1	2	2
Norway		1	1	2
Poland		1	1	0
Israel		1	0	1
Total		47	84	84

School		Training	Teaching
University of Chicago	🇺🇸	9	13
Harvard University	🇺🇸	13	7
Massachusetts Institute of Technology	🇺🇸	12	7
University of Cambridge	🇬🇧	5	5
Princeton University, New Jersey	🇺🇸	4	5
Columbia University, New York	🇺🇸	4	4
University of California at Berkeley	🇺🇸	2	5
Carnegie-Mellon University	🇺🇸	4	2
Stanford University	🇺🇸	3	3
Yale University, New Haven	🇺🇸	1	4
London School of Economics	🇬🇧	3	1
Stockholm University	🇸🇪	2	2
Universities de Paris	🇫🇷	2	1
University of California at Los Angeles	🇺🇸	2	1
University of Minnesota	🇺🇸	2	1
University of Oslo	🇳🇴	1	2
University of Leiden	🇳🇱	2	0

School		Training	Teaching
John Hopkins University	🇺🇸	2	0
Oxford University	🇬🇧	1	1
New York University	🇺🇸	0	3
Berlin University	🇩🇪	1	0
University of Wisconsin	🇺🇸	1	0
Vienna University	🇦🇹	1	0
Leningrad University	🇷🇺	1	0
New School for Social Research	🇺🇸	1	0
University of Frankfurt am Main	🇩🇪	1	0
Cornell University	🇺🇸	1	0
University of Nottingham	🇬🇧	1	0
Warsaw University	🇵🇱	1	0
University of Rochester	🇺🇸	1	0
Center for Study of Public Choice, Fairfax	🇺🇸	0	1
City University of New York	🇺🇸	0	1
University of Pennsylvania, Philadelphia	🇺🇸	0	1
Washington University, St. Louis	🇺🇸	0	1

School		Training	Teaching
Academy of Sciences, Moscow		0	1
Salzburg University		0	1
Rheinische Friedrich-Wilhelms - Universität, Bonn		0	1
The Netherlands School of Economics, Rotterdam		0	1
George Mason University		0	1
University of California, San Diego		0	1
Arizona State University		0	1
Hebrew University of Jerusalem		0	1
Institute for Advanced Study, Princeton		0	1
University of Maryland		0	1
Indiana University		0	1
Northwestern University		0	1
Toulouse 1 Capitole University		0	1

Particulars of this prize

- **Second woman to be awarded**

Elinor Ostrom (1933-2012)
2009 prize

Esther Duflo (1972-…)
2019 prize

- **First couple to be awarded**

Duflo and Banerjee, married in 2015, have two children aged 5 and 7

Nobel Prize 2019

Understanding Development and Poverty Alleviation

Main papers

- Banerjee, Abhijit and Esther Duflo. 2005. "Growth Theory Through the Lens of Development Economics," In *Handbook of Economic Growth, Vol. 1A.* Durlauf, Steve and Philippe Aghion (eds.), 473–552. Amsterdam: North Holland, Elsevier.

- Banerjee, Abhijit and Esther Duflo. 2007. "The Economic Lives of the Poor." *Journal of Economic Perspectives* 21(1): 141-167.

- Banerjee, Abhijit and Esther Duflo. 2009. "The Experimental Approach to Development Economics," *Annual Review of Economics* 1: 151–178.

- Duflo, Esther. 2004. "Scaling Up and Evaluation." In Bourguignon, Francois and Boris Pleskovic (eds.) *Accelerating Development.* New York, NY: Oxford University Press.

- Duflo, Esther. 2006. "Field Experiments in Development Economics," In *Advances in Economics and Econometrics: Theory and Applications*, Ninth World Congress, Volume 2, Blundell, Richard, Whitney Newey, and Torsten Persson (eds.), 322–348. New York, NY: Cambridge University Press.

- Duflo, Esther, Rachel Glennerster and Michael Kremer. 2006. "Using Randomization in Development Economics Research: A Toolkit," NBER Technical Working Paper 333. Reprinted in *Handbook of Development Economics*, 2007, Volume 4, Schultz, T. Paul and John Strauss (eds.), 3895-3962. Amsterdam: North Holland, Elsevier.

- Kremer, Michael. 2003. "Randomized Evaluations of Educational Programs in Developing Countries: Some Lessons." *American Economic Review* 93(2): 102-106

Best sellers and institution

Abhijit V. Banerjee and Esther Duflo (2011) *Poor Economics: A Radical Rethinking of the Way to Fight Global Poverty*, PublicAffairs

Abhijit V. Banerjee and Esther Duflo (2019) *Good Economics for Hard Times: Better Answers to Our Biggest Problems*, PublicAffairs
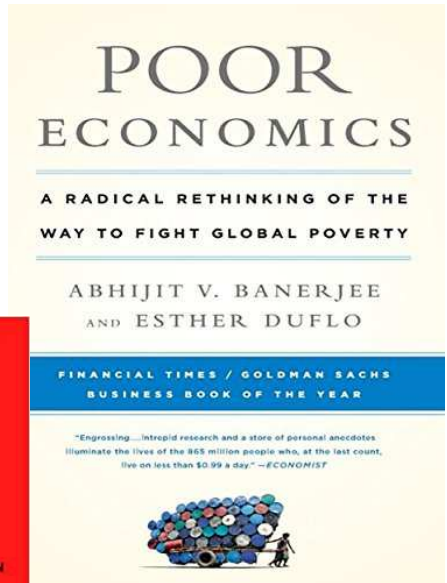
Sendhil Mullainathan (1972-..)

Banerjee and Duflo co-founded **J-PAL** with Sendhil Mullainathan at the Massachusetts Institute of Technology (MIT) in 2003 with a mission of reducing poverty by ensuring that policy is informed by scientific evidence. Began with six staff members, and has since expanded to more than **400** research, policy, education, and training professionals across **seven** offices worldwide.

Rachel Glennerster (1965-...) was director of J-PAL until 2017, and is currently the Chief Economist at the **Department for International Development** (DFID), the UK's ministry for international development cooperation
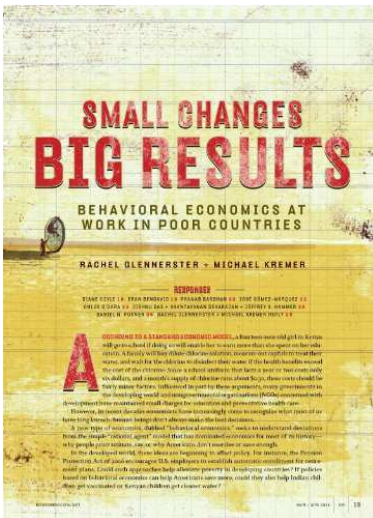
Rachel Glennerster and Michael Kremer (2011) *Small Changes, Big Results : Behavioral Economics at Work in Poor Countries*, Boston Review
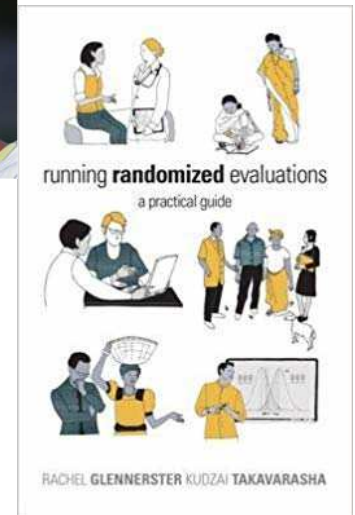
Michael Kremer and Rachel Glennerster (2016) *Strong Medicine: Creating Incentives for Pharmaceutical Research on Neglected Diseases*, Princeton University Press
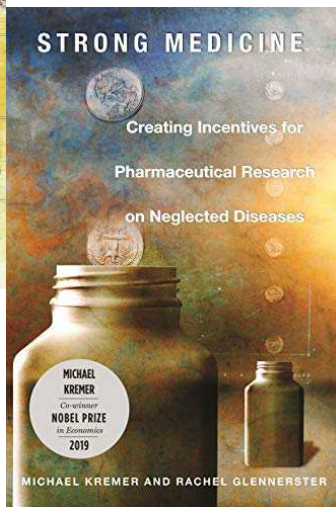
Rachel Glennerster and Kudzai Takavarasha (2013) *Running Randomized Evaluations: A Practical Guide*, Princeton University Press

Basic ideas

- The modern approach to development economics relies on **two simple but powerful ideas**.
  - One idea is that **empirical micro-level studies** guided by economic theory can provide crucial insights into the design of policies for effective poverty alleviation.
  - The other is that the best way to draw precise conclusions about the true path from causes to effects is often to conduct a **randomized controlled field trial**.

Three steps

- First, starting in the mid-1990s, Kremer and various colleagues launched a series of **field experiments**. In essence, his approach amounted to **breaking down the question** of how to boost human-capital accumulation into smaller, more manageable topics, each of which could be rigorously studied via specifically designed randomized controlled trials.

- Second, in a series of contributions, Banerjee and Duflo articulated the intellectual case for a **microeconomic approach** to help understand various aspects of the broader (macroeconomic) **development problem**

- Third, by designing new experimental-research methods — e.g., to address the key challenge of **external validity** — the Laureates firmly established the new approach and laid out a clear course forward for a new generation of researchers.

Randomized controlled trial

- Is a method for assessing the causal impact of a certain intervention or program. In essence, it is designed to answer **counterfactual questions**: How would individuals exposed to a program have fared in the absence of the program? Conversely, how would other individuals who were not exposed have fared, had they had the opportunity to participate?

- To solve the **selection problem** individuals are to randomly assigned— or more generally the units of analysis, such as households, communities or schools — to a treatment and a control group. The **only systematic differences across the groups arise through their exposure to treatment**.

- These trials give researchers **complete control** not only over the assignment mechanism, which removes the selection bias, but also over the treatment itself. Experiments allow scholars to manipulate treatments of interest to create events that have not yet been observed.

- The strong emphasis on **incentives and constraints** is an important reason why designs of field experiments differ from designs in laboratory. These behavioral responses are not only central to understanding the experimental results themselves, but also to understanding broader human behaviors.

The problem of external validity

- One of the most controversial aspects of this approach is the external validity:
  - even if the conclusions of the experiment are clear, is it reasonable to generalize them to the universe?
- The authors have tried to find ways to access the problems:+
  - **scale** mays interfere, if the original experiment is small
  - **government** implementation differs from ONG actions
  - **equilibrium** effects, from partial to general
  - several **spillovers** may appear when generalizing
  - **context** dependence is always an issue
  - **randomization bias** (subjects who agree to participate in a small experiment may be different from the rest of the population)
  - **piloting bias** (findings from a smaller project with high degrees of monitoring and control may not be replicable in a program run at scale).

Main sectoral results

- On **schooling**, strong evidence now shows that the employment of contract teachers is generally a cost-effective way to improve student learning, while the impact of reduced class size is mixed, at best.

- On **health**, poor people's investment in preventive care has been shown to be very sensitive to the prices of health products or services, giving a strong argument for generous subsidies to such investments.

- On **credit**, growing evidence indicates that microfinance programs do not have the development effects that many had thought when these programs were introduced on a large scale.

Aggregate result

They started by documenting a striking empirical fact: low- and middle-income economies encompass **enormous heterogeneities in the rates of return to the same factors of production** within countries, which dwarf observed cross-country heterogeneities in economy-wide (average) returns. In other words, some firms and individuals in developing countries use the latest technology, while others in the same country and sector use outdated production methods. In high-income countries, these within-sector differences in productivity are much smaller.

Some education results
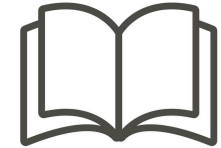
- Given the context, simply providing more resources had a limited impact on school quality.
  - More textbooks per student did not improve average test scores, but did improve test scores of the most able students.
  - Giving flip charts to schools had no effect on student learning.
  - Health interventions (deworming of children and school meals) reduced school absenteeism, but did not improve test scores.
- Substantial positive medium-term effects on student learning from
  - hiring paraprofessionals to work with poorly performing third- and fourth-grade students outside their regular classroom
  - computer-assisted learning program where fourth-grade children played games with math puzzles on a shared computer for two hours a week
  - teacher absence dropped by half in schools where teachers received an additional bonus per day attended

Meta-studies in education
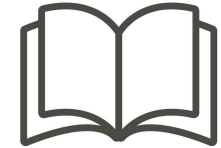
"interventions that focus on improved pedagogy (especially supplemental instruction to children lagging behind grade level competencies) are particularly effective, and so are interventions that improve school governance and teacher accountability," in Glewwe, Paul and Karthik Muralidharan. 2015. "Improving School Education Outcomes in Developing Countries: Evidence, Knowledge Gaps, and Policy Implications." RISE Working Paper 15/001.

"pedagogical reforms that match teaching to students' learning levels are highly cost effective at increasing learning, as are reforms that improve accountability and incentives, such as local hiring of teachers on short term contracts." in Kremer, Michael, Conner Brannen and Rachel Glennerster. 2013. "The Challenge of Education and Learning in the Developing World." *Science* 340(6130): 297-300.

Some health results

- Important externalities of health interventions
  - large external effects on worm-infection rates, as well as on subsequent school-participation rates, extending about 2 miles (at least 3 km) away from treatment schools.
- Protection for water springs from fecal contamination
  - The program reduced the presence of bacteria by two-thirds and children had 25-percent lower incidences of diarrhea.
  - common property rights delivers higher welfare than a private-property-rights system. At higher income levels private property rights could stimulate enough investment in spring protection to outweigh the static costs associated with giving landowners local market power over water.
- Does pricing of health increases value?
  - Uptake of 75 percent in schools with free deworming pills, only 18 percent with a fee of US$0.40 (still a heavily subsidized price)

Some productive results
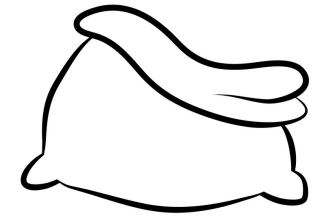
- Why do so many smallholder farmers fail to take up simple modern technologies, such as fertilizer, despite evidence of very high returns from agricultural trials?
  - it is not necessarily easy to use fertilizer in a correct way. Farmers may thus not use it because it is unprofitable unless the right quantity is applied
  - farmers are stochastically present-biased — in the sense of being hyperbolic discounters — and naive, such that they underestimate the likelihood that they will be present-biased in the future. Because purchasing fertilizer has a small fixed cost, hyperbolic discounting implies that farmers who plan to buy fertilizer will defer their purchase until close to a deadline. But at that point, they will be impatient again and choose not to buy.

Some results in gender problems

- In 1993, India's federal government introduced a new constitutional rule that each state had to reserve a third of all positions as chair of village councils for women.
  - They found that female leaders seemed to make decisions that accorded better with the preferences of women (more on drinking water and roads, less in education)
  - This raised the electoral prospects for female candidates in future elections, by decreasing stereotypes among voters

Some results in credit problems

- The research found evidence of significant credit constraints even for large firms

- On the micro-credit movement
  - the evidence does not suggest a particularly high demand for microcredit.
  - nor significant differences for any key development outcomes, such as per-capita consumption expenditures, health, women's empowerment, or children's education.