

Technology and Career Development in the 21st Century








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The Second Half of the Chessboard

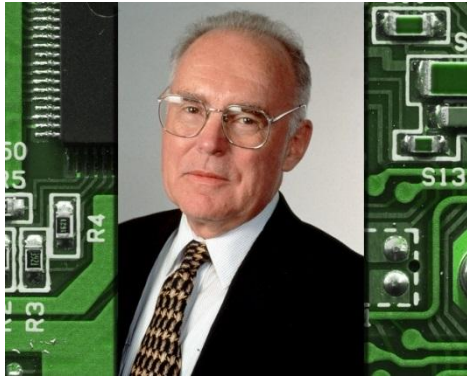
							128
1	2	4	8	16	32	64	128
256	512	1024	2048	4096	8192	16384	32768
256	512	1024	2048	4096	8192	16384	32768
65536	131K	262K	524K	1M	2M	4M	8M
65536	131072	262144	524288	1048576	2097152	4194304	8388608
16M	33M	67M	134M	268M	536M	1G	2G
16777216	33554432	67108864	134217728	268435456	536870912	1073741824	2147483648
4G	8G	17G	34G	68G	137G	274G	549G
4194304000	8388608000	16777216000	33554432000	67108864000	134217728000	268435456000	536870912000
1T	2T	4T	8T	17T	35T	70T	140T
108021132776	216042265552	432084531104	864169062208	1728338124416	3456676248832	6913352497664	13826704995328
281T	562T	1P	2P	4P	9P	18P	36P
301474876710400	602949753421120	1125898906042240	2251797812084480	4503595624168960	8907191248337920	17814382496675840	35628764993351680
72P	144P	288P	576P	1E	2E	4E	9E

100,000kg of grain
(25mg per grain)

461,168,602,000 metric tons
 - Larger than mt. Everest
 - 1000x global production in 2010

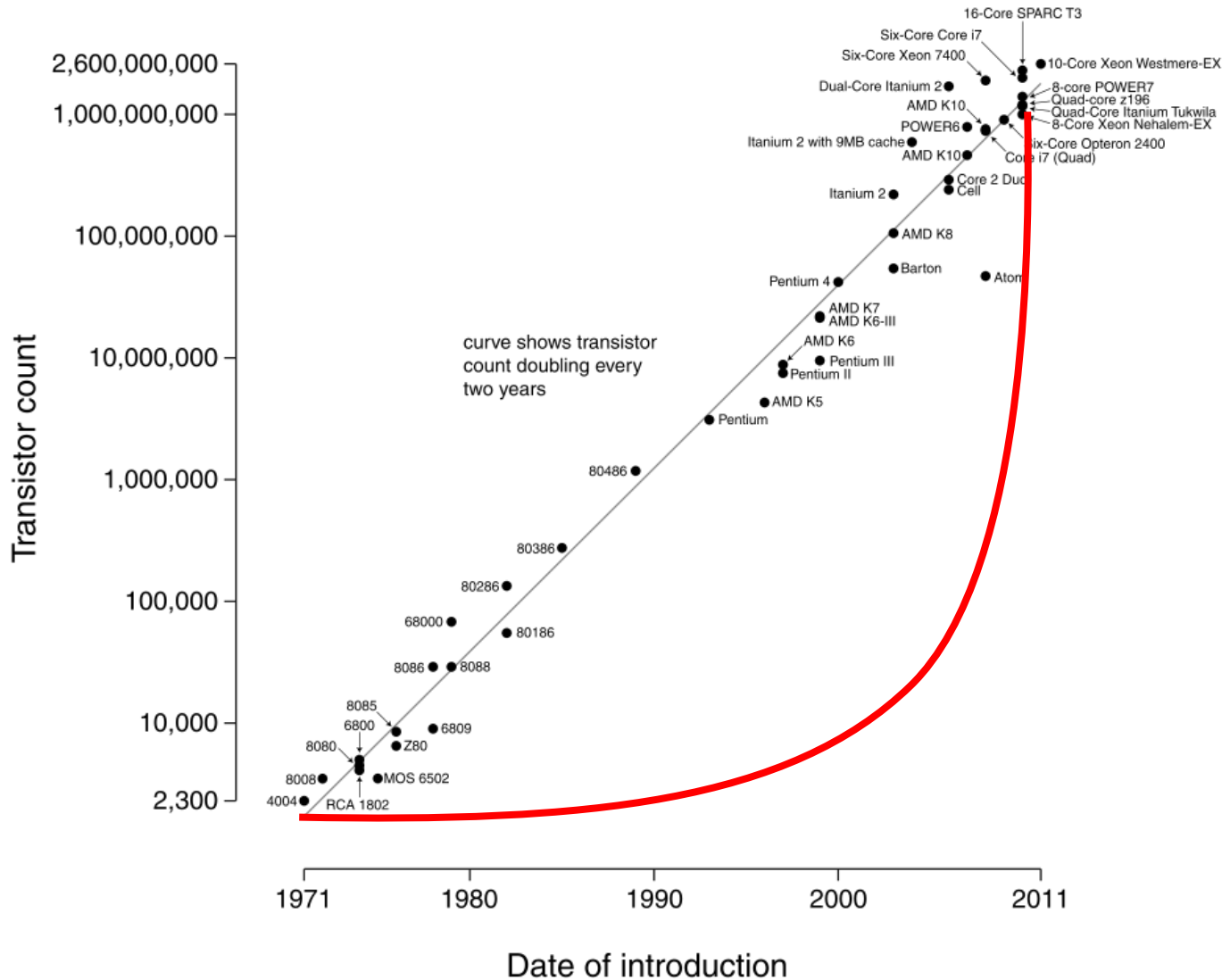
Moore's Law (1965)

- “The number of transistors in a minimum cost integrated circuit will double every 12-18 months.”



- Gordon Moore, co-founder of Intel Corp.
- Integrated circuits were invented in 1958 and used in computers in 1963.

Microprocessor Transistor Counts 1971-2011 & Moore's Law










Exercise: Put Moore on the Chessboard

- Start in 1958
- Add 18 months for each square on the chessboard
 - Double the computer capacity

- Square 32 : 2004
- 2013 : Square 38



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4294967296	8589934592	17179869184	34359738368	68719476736	137438953472	274877906944	549755813888
1T	2T	4T	8T	17T	35T	70T	140T
1099511627776	2199023255552	4398046511104	8796093022208	17592186044416	35184372088832	70368744177664	140737488355328
281T	562T	1P	2P	4P	9P	18P	36P
387479375719040	774958751438080	1549917502876160	3099835005752320	6199670011504640	12399340023009280	24798680046018560	49597360092037120
72P	144P	288P	576P	1E	2E	4E	9E



Technology and Employment



Kiva Systems Quiet Logistics

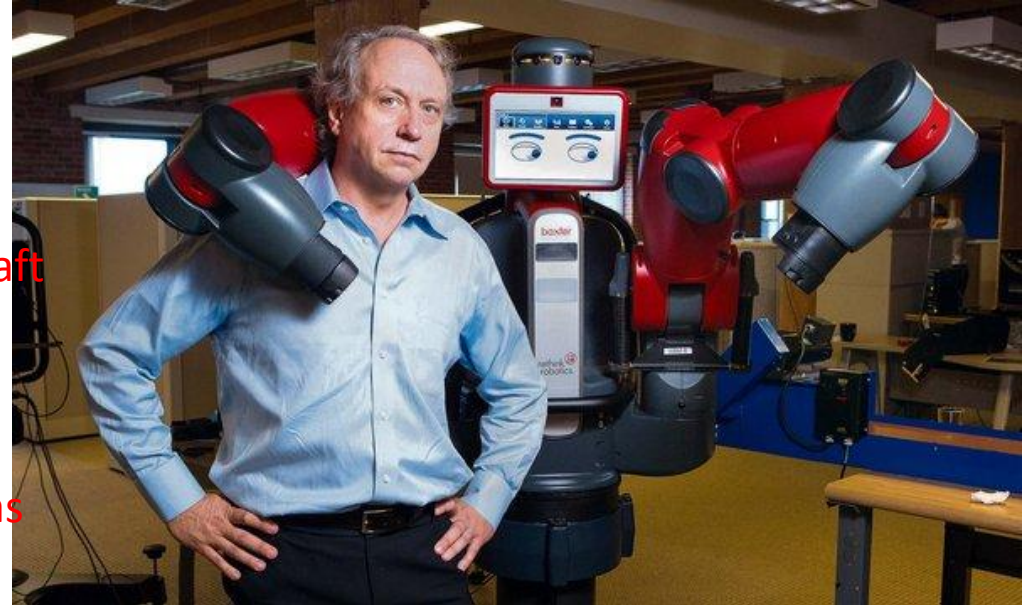
<http://www.youtube.com/watch?v=qU4YMDJNzpg>





Schaft

Atlas

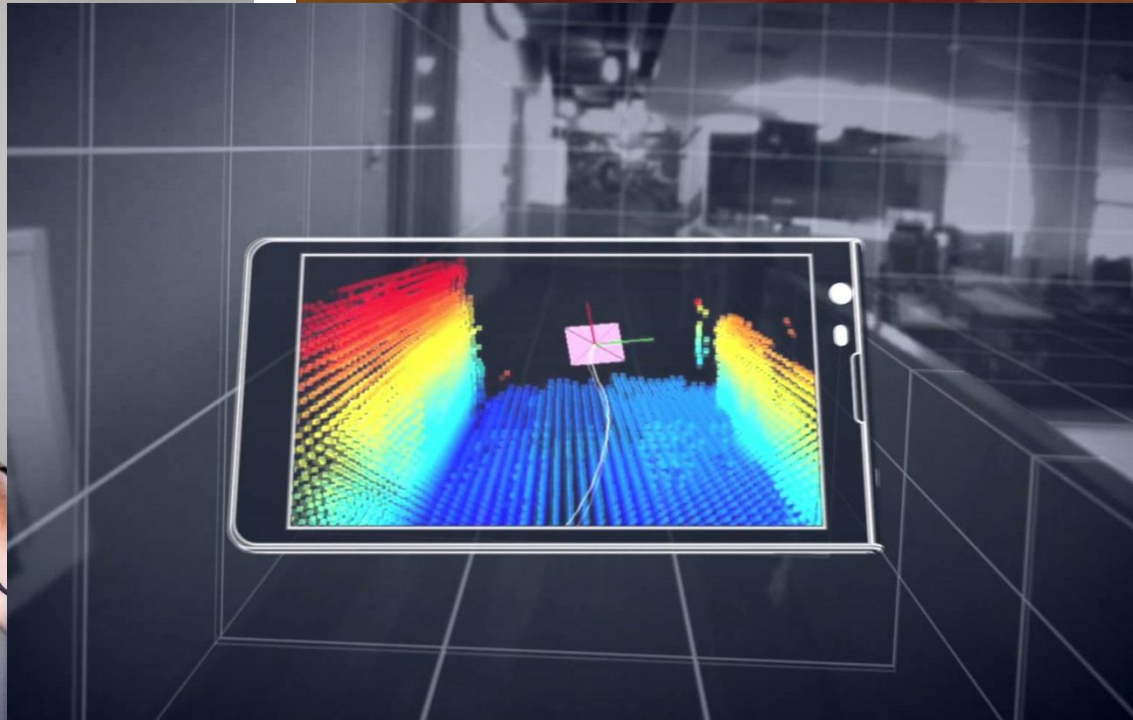


Baxter

Bigdog

Boston

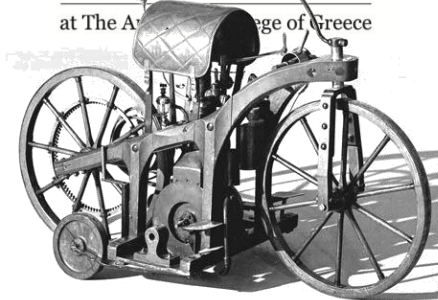
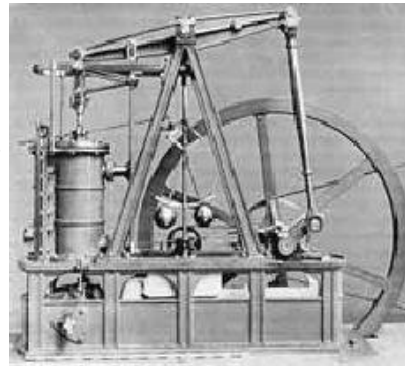
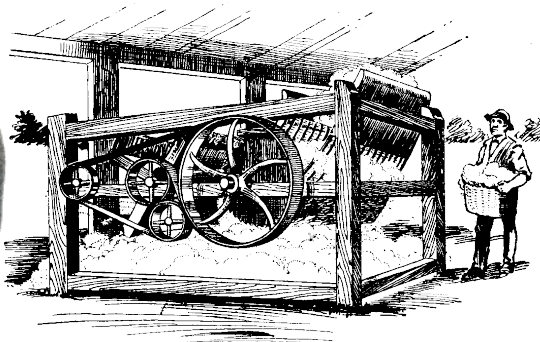




General Purpose Technologies



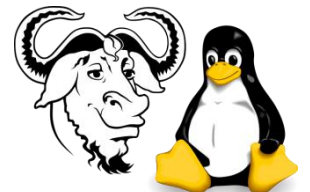
Business unusual
at The American College of Greece



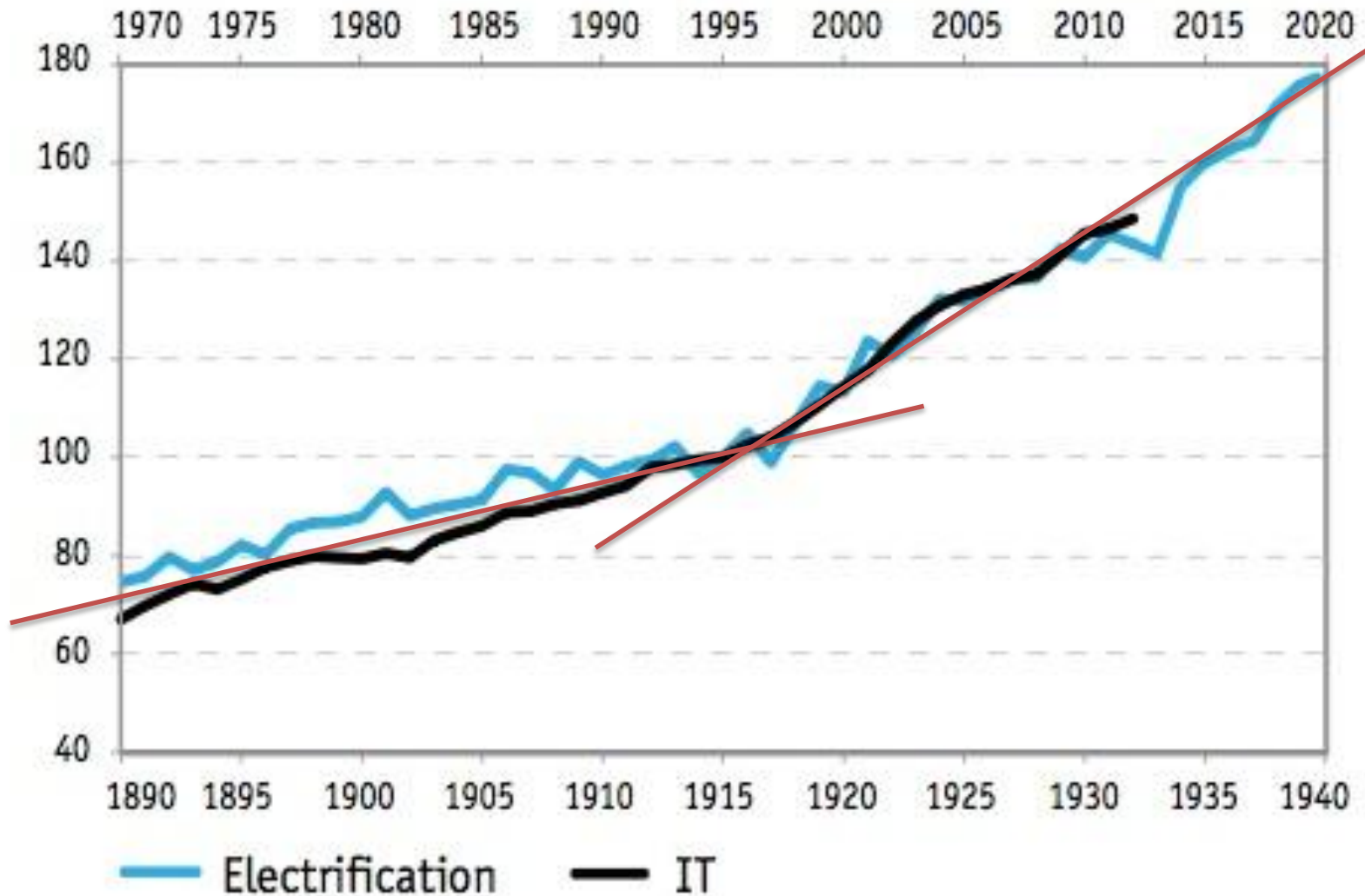
Spur Sustained Productivity Growth Through Recombinant Innovation



KICKSTARTER



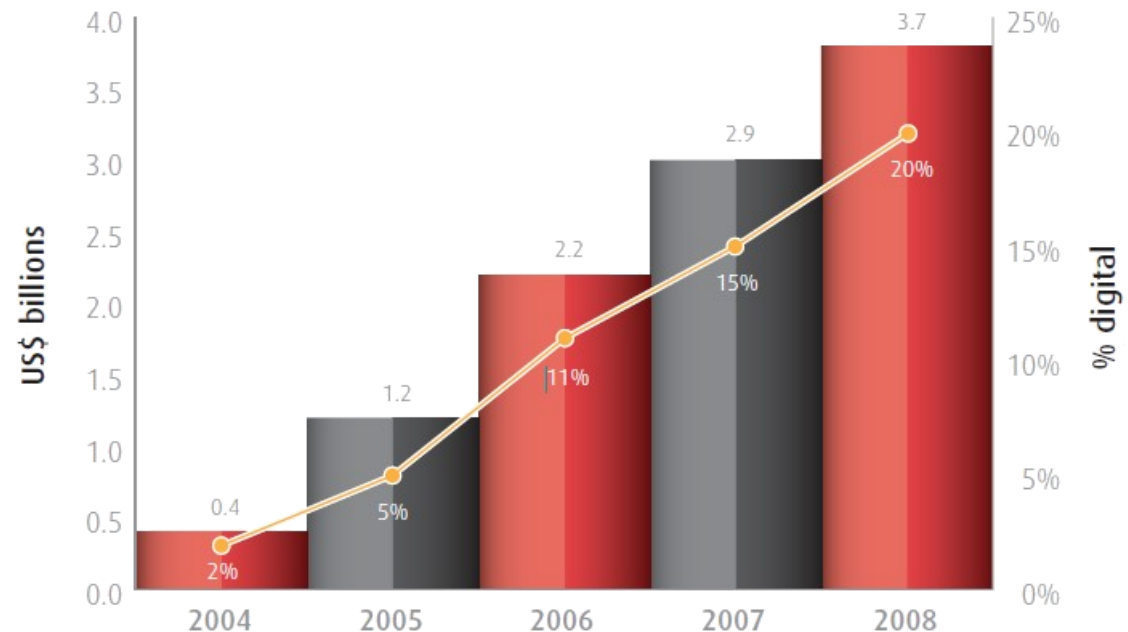
The Good News about productivity



From **disk** to **digital**

- From 2004 to 2008
 - Sales of disks: 800m units → 400m units (-50%)
 - Total revenue: \$21.3bn → \$7.4bn (-40%)

Digital music
revenues (2008).



Source: IFPI. Figures include online, mobile and subscription trade revenues. 2008 figures are estimates. Figures rounded and expressed on a fixed exchange rate.

So...

- The tipping point of exponential tech evolution
- The economics of digitization of everything
- Recombinant innovation on a global scale
- Generate not only sustained **productivity** and **GDP** growth but also even greater **consumer surplus**.



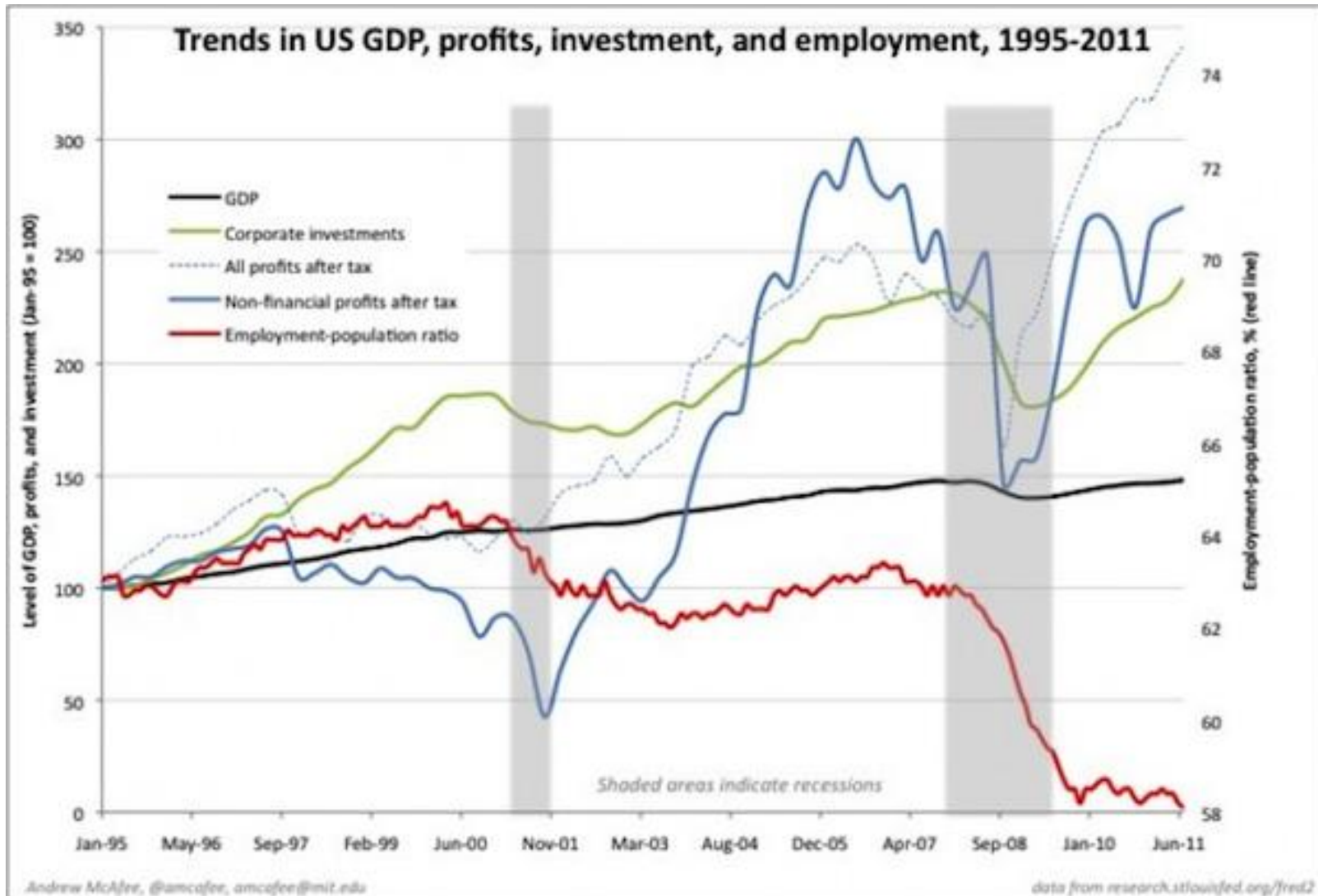
From the 20th to the 21st



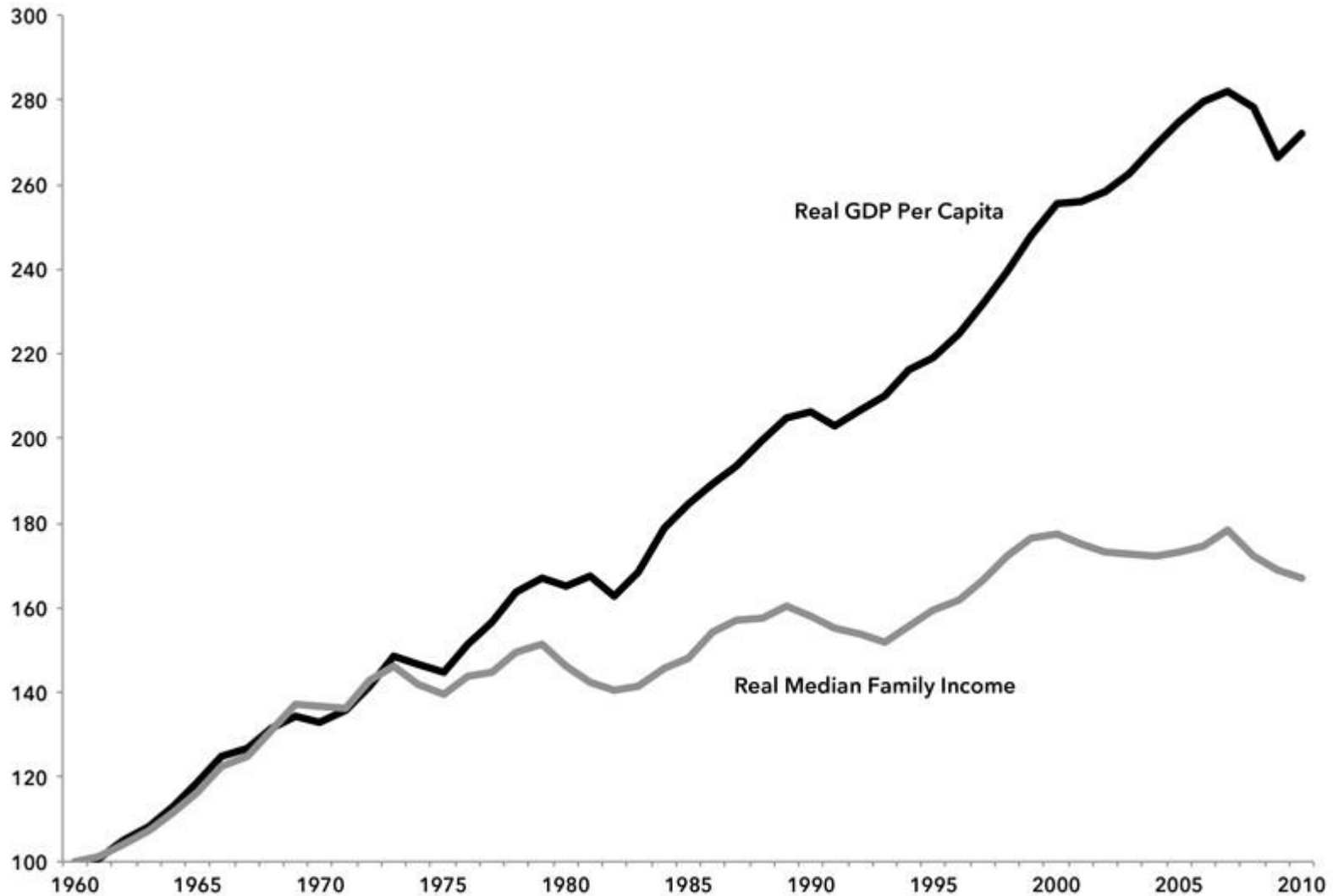
- Founded in 1880
- 2013: Bankrupt
- Top value: \$30bn in 1997
- Employees: 145,300
- Value/employee: \$207k
- Indirect employment: ∞



- Founded in 2010
- 2013 Acquired by fb
- Valuation: \$1bn
- Employees: 15
- Value/employee: \$66m
- Indirect employment: ?



Here it is



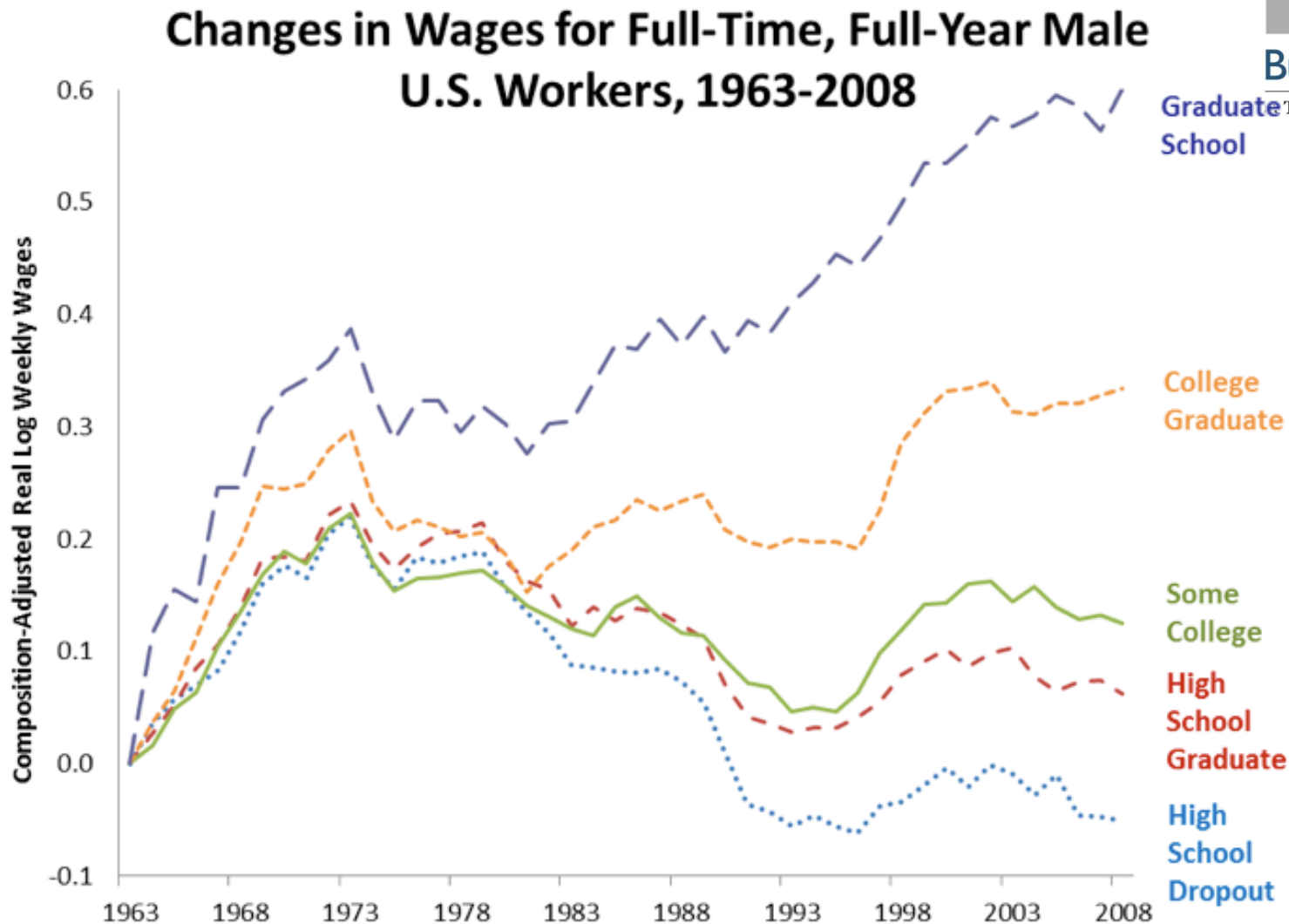


Figure 3.5: Wages have increased for those with the most education, while falling for those with the least. Source: [Acemoglu and Autor](#) analysis of the Current Population Survey for 1963-2008.

Race *with* the machine

- To save the ice man's job, would you rather have an ice fridge?
- Technology creates more jobs in the medium term than it destroys in the short term
- High-level complementary jobs
- Lower level crafts



What computers can't do

- Skill acquisition and transition *agility*

- Take all the MOOCs that you can

- Keep returning to school

- *Never say never*



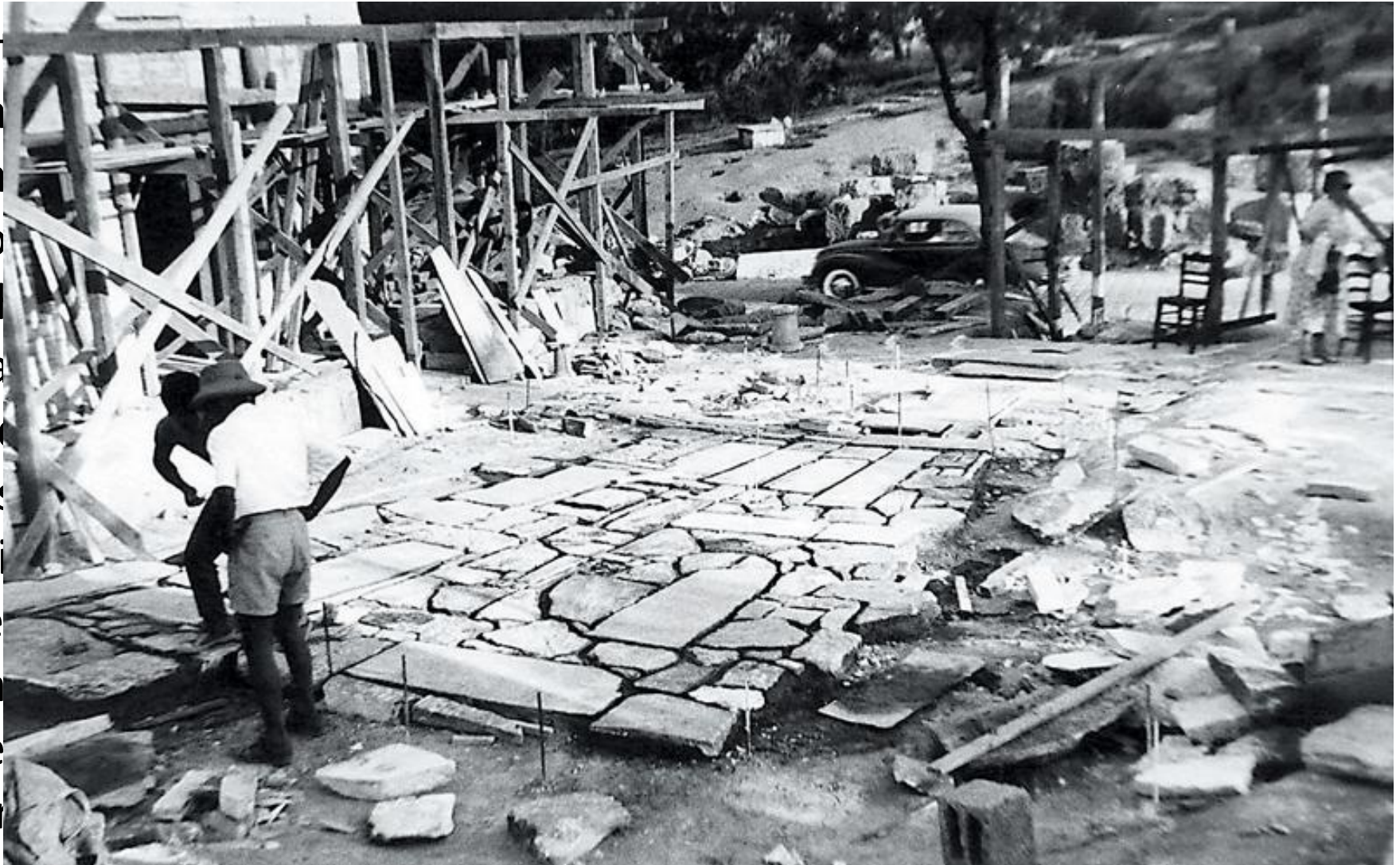
Man is the measure of all things

Protagoras



Business unusual

at The American College of Greece



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