The Digital Revolution and the State: The Great Reversal

Doing Capitalism in the Innovation Economy
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“The Innovation Economy begins with discovery and culminates in speculation. **Over some 250 years, economic growth has been driven by successive processes of trial and error and error and error and error:** upstream exercises in research and invention, and downstream experiments in exploiting the new economic space opened by **innovation**. Each of these activities necessarily generates much waste along the way: dead-end research programs, useless inventions and failed commercial ventures. **In between, the innovations that have repeatedly transformed the architecture of the market economy, from canals to the internet, have required massive investments to construct networks** whose value in use could not be imagined at the outset of deployment. **And so at each stage, the Innovation Economy depends on sources of funding that are decoupled from concern for economic return.**

The Three-Player Game

“I have come to read this history as driven by three sets of continuous, reciprocal interdependent games played between the state, the market economy and financial capitalism. Through the centuries, the state and the market economy have variously collaborated and competed in the allocation of resources and the distribution of income and wealth. And financial capitalism has emerged to exploit discontinuities in the evolution of market and political processes, while it depends on those same processes for its prosperity and even at times its survival.”

The Three-Player Game: Alternative Configurations

From this dynamic and unstable configuration of political, economic and financial forces ... has emerged a world in which state investment in fundamental research induces financial speculation to fund construction of transformational technological infrastructure, whose exploitation, in turn, raises living standards for everyone dependent on the productivity of the market economy. But the three-player game is also responsible for a world in which bubbles and crashes in the financial system spill over and liquidate both the employed and their employers, generating appeals to the political process for redress and relief. In yet another version, we find ourselves in a world where “malefactors of great wealth” – to invoke Theodore Roosevelt’s epithet – are able to exploit the political process in order to preserve and protect their exploitation of the market economy.

(W. H. Janeway, Doing Capitalism, 2nd edition, p. 5)
“War Made the Industrial Revolution”

“Britain was in major military operations for eighty-seven of the years between 1688 and 1815….War was the norm in this period. And it shaped the economy…

“[T]he British state did much more than minimalistically provide the financial and transportation infrastructure for industrial revolution;...it consumed metal goods in the mass quantities that industrial revolution necessary and possible. Just its bulk demand for guns alone stimulated innovations in industrial organization and metallurgical technology with enormous ripple effects. At the start of the eighteenth century, it contracted for tens of thousands of guns; by the early nineteenth century its needs were in the millions. That shift in magnitude signifies industrial revolution in the metallurgical world....”

“The history of the United States is no different from that of other modern countries; fighting wars and preparing for wars have been an absolutely critical spur of economic growth and development. Many of the key industrial and organizational breakthroughs of the late eighteenth and nineteenth centuries came in industries that were developing weapons or other supplies, such as ships or uniforms, that were being procured on a large scale by the military. Starting with the Revolutionary War, continuing with the War of 1812, the wars against the Native Americans, and the Civil War, some of the most important innovations in production and organizational technologies came in the manufacture of guns and other weapons. In fact, the rifle figures prominently in manufacturing history as one of the first instances of the use of interchangeable parts to facilitate expanded production. Moreover, the machine tools developed for weapons production then migrated to industries producing sewing machines, bicycles, and ultimately automobiles.”

“One mechanism through which defense-related R&D investments can aid innovation is military funding for new bodies of scientific or engineering knowledge that supports innovation in both defense-related and civilian applications….This channel…is likely to produce the greatest benefits…in basic and applied research, rather than development.

“A second important channel through which defense-related R&D affects civilian innovative performance are the classic ‘spin-offs,’…[C]ivilian spin-offs…appear to be most significant in the early stages of development of new technologies…[before] civilian and military requirements…diverge….

“A third important channel…is procurement….The US military services…have played a particularly important during the post-1945 period as ‘lead purchaser’….

“Defense-related research spending contributed to the creation of a university-based US ‘research infrastructure’ during the postwar period that has been an important source of civilian innovations, new firms, and trained scientists and engineers….”

The NSF and the Page Rank Algorithm

Discovery

On the Origins of Google

Even in the early days of the Internet, people saw the need for better interfaces to growing data collections. A graduate student supported by an NSF digital library project at Stanford University uncovered the missing links in Web page ranking.
Productive versus Unproductive Bubbles

- Focus of Speculation
  - Productivity Enhancing
  - Non-Productivity Enhancing

- Locus of Speculation
  - Banking System
  - Capital Markets

- 2005-2008
- 1998-2000
The British Railway Manias

The R&D Boom of the Late 1990s: Freed from Financial Constraints

Figure 2b. High-tech R&D, cash flow, and new share issues (young firms). The sample is all young high-tech firms with coverage in Compustat. A firm is classified as young for the first 15 years following the year it first appears in Compustat with a stock price. The high-tech industries are SICs 283, 357, 366, 367, 382, 384, and 737. The heavy line plots the sum of R&D for all young high-tech firms, the dashed line plots the sum of gross cash flow, and the thin line plots the sum of net new stock issues with negative net issues set equal to zero.
The Two Fundamental Theorems of Venture Capital

“Cash and Control”

“Corporate Happiness is Positive Cash Flow”
Post-2008 Speculation: I
Extending the Digital Revolution

The Global Unicorn Club
Current Private Companies Valued At $1B+
(including whisper valuations)

Total Number of Unicorn Companies: 270
Total Cumulative Valuation: ~ $864B

DOWNLOAD THE FULL LIST OF BILLION DOLLAR COMPANIES TO SEE
THEIR FUNDING DATA, INVESTORS, AND MORE

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What is a Unicorn?
A unicorn company or unicorn startup is a private company with a valuation over $1 billion. As of August 2018, there are more than 260 unicorns around the world. Variants include a decacorn, valued at over $10 billion, and a hectocorn, valued at over $100 billion.
This Essay highlights emerging governance problems presented by persistent Unicorns. It argues that recent market trends and deregulatory reforms have weakened or eliminated the principal mechanisms that imposed discipline on start-up company founders. Recent scandals at prominent Unicorns suggest that investors have erred in placing blind faith in the honesty and capabilities of start-up founders. **Policymakers should learn from these disasters and close regulatory loopholes that allow Unicorns to persist in limbo between private and public status for extended periods of time.**

Part I provides an overview of how the IPO has shifted from the preferred exit strategy in the eyes of entrepreneurs to a regulatory morass to be shunned. It traces developments in the market for start-up company shares, and regulatory reforms that facilitated the proliferation of Unicorns. Part II highlights unique governance risks posed by Unicorns, addressing both societal and investor protection concerns. Part III offers suggestions on how to address Unicorn risks, and raises fundamental questions about the future of Unicorns in our economy.
Uber Investor Sues Travis Kalanick for Fraud

By Mike Isaac
Aug. 10, 2017

Theranos Founder Elizabeth Holmes Indicted on Fraud Charges

By Reed Abelson
June 15, 2018
Post-2008 Speculation: II
Cryptomania

The Two (Modern) Globalizations

Courtesy of Brad DeLong:

Globalization over 5 centuries (1500-2011)

Shown is the sum of world exports and imports as a share of world GDP (%)
The individual series are labeled with the source of the data

First Globalization:
- Trade: capital & resource-rich
- Migration: finance & labor to resource-rich

Retreat:
- Faster progress in factories (mass production) than transport
- Demand management
- Beggar-thy-neighbor

Second Globalization:
- Trade: north-north intra-industry

Hyperglobalization:
- Trade: north-south low-wage
- Production: intercontinental value chains

Second Retreat?
- Robots: trivial labor costs drive “restoring”
- Politics: BLAME CANADA!! (and other foreigners who don’t vote in our elections)
- Demand management: with fiscal policy off limits, and monetary policy tapped out, redirecting demand to domestic producers about the only remaining lever to pull

Data sources: Klasing and Milonis (2014), Estevadeordal, Frantz and Taylor (2003) and the Penn World Tables Version 8.1
The interactive data visualization is available at OurWorldinData.org. There you find the raw data and more visualizations on this topic.

Licensed under CC-BY-SA by the author Max Roser.
The Political Trilemma

The Political Trilemma of the World Economy

- Deep Economic Integration
  - Golden Straitjacket
  - Nation State
  - Bretton Woods compromise
- Global federalism
  - Democratic Politics

D. Rodrik, *The Globalization Paradox*
“[W]e find strong evidence that congressional districts exposed to larger increases in import competition disproportionately removed moderate representatives from office in the 2000s. Trade-exposed districts initially in Republican hands become substantially more likely to elect a conservative Republican, while trade-exposed districts initially in Democratic hands become more likely to elect either a liberal Democrat or a conservative Republican. Polarization is also evident when breaking down districts by race: trade-exposed locations with a majority white population are disproportionately likely to replace moderate legislators with conservative Republicans, whereas locations with a majority non-white population tend to replace moderates with liberal Democrats.

(D. Autor et. al., “Importing Political Polarization, The Electoral Consequences of Rising Trade Exposure,” April 2016.)
Politics of Automation: Exposure to Robots and the Vote for Trump

Notes: This figure presents a non-parametric illustration of the county-level relationship between percentage point differences in the Republican two-party vote share between the 2016 and 2012 elections based on data reported in Dave Leip’s Atlas of US Presidential Elections and changes in the exposure to robots between the immediate years prior to each election based on data from the International Federation of Robotics and the American Community Survey respectively, which we describe in more detail in the main text. To construct the figure, we sorted all observations into 30 equal-sized bins and plotted the mean change in the Republican two-party vote share versus the exposure to robots within each bin, while the line corresponds to a fitted OLS regression based on the underlying (ungrouped) data.

(C. B. Frey, Berger, T., Chen, C., “Political Machinery: did robots swing the 2016 US presidential election,” Oxford Review of Economic Policy (34:3, 2018), Fig. 1)
Financialization: I
Financialization: II
The Role of IT in the Great Credit Bubble

“Finally, the impact of modern finance theory on modern finance practice would never have been realized except for the IT revolution. In no sector of the world economy did advances in computing have a more revolutionary effect than in finance. Here was a world peopled by smart, rich and intensely competitive players who were swimming in oceans of data. The trading desks rapidly moved beyond deploying computers merely to transact and record the growing volume of trades on the stock exchange. Traders mobilized computers to analyze data in order both to identify opportunities for profitable arbitrage and to create new instruments for trading, from swaps of currency and interest payments, to instantaneously updated stock indices, to asset-backed securities of all sorts, beginning with mortgages and extending to credit card receivables and student loans.

“...By making it possible to transform credit instruments that had traditionally been bought and held by lenders into tradable securities, computerization enabled the extension of the originate-and-distribute model from the equity and bond markets across the entire spectrum of credit, even as it also offered the false promise of constructing insurance against loss.”

(Janeway, Doing Capitalism, 2nd edition, pp. 186-7)
Financialization: III

Cross-border Bank Claims (denominated in all currencies)\(^1\)

In billions of USD

2002

2007

1 The thickness of the arrows indicates the size of the outstanding stock of claims. The direction of the arrows indicates the direction of the claims: arrows directed from region A to region B indicate lending from banks located in region A to borrowers located in region B.

Source: BIS locational banking statistics.
The Global Financial Crisis

CRASHED
How a Decade of Financial Crises Changed the World
Adam Tooze
Author of The Deluge
The Political Consequences of Financial Crises

**Figure 1.** Far-right vote shares after financial crises (local projections)

Notes: Each path shows local projections (see Jordà 2005) of the cumulative change relative to peak for years 1–5 of the Recession and recovery period. The red line refers to the average path in financial crisis recessions and the shaded region is a 90% confidence interval. The left panel covers the years 1919-2014, excluding World War II, the middle panel 1919-1938, and the right panel 1950-2014. The dependent variable is the combined vote share of all electorally successful (vote share > 0.1%) far-right political parties in the most recent general election.

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“And so the IT revolution, sponsored by the state and funded by speculation, feeds back not only to transform the market economy. It also conditions the political dynamics that shape the capacity of the state to offset and balance the coordination failures and self-destructive outcomes of markets disrupted by those same digital technologies....”

(Janeway, Doing Capitalism, 2nd edition, p. 316)
Delegitimizing the State: I
Delegitimizing the State: II
Delegitimizing the State: III

“[G]overnment is not the solution to our problem; government is the problem.”
Public Sector Share of National Economy
The Macro Consequences of the Digital “Superstar” Firms

“(i) there has been a rise in sales concentration within four-digit industries across the vast bulk of the U.S. private sector;
(ii) industries with larger increases in product market concentration have experienced larger declines in the labor share;
(iii) the fall in the labor share is largely due to the reallocation of sales between firms rather than a general fall in the labor share within incumbent firms;
(iv) the reallocation-driven fall in the labor share is most pronounced in precisely the industries which had the largest increase in sales concentration; and
(v) these patterns are also present in firm- and industry-level datasets from other OECD countries.”

Data as Source of Competitive Value

“Data generates business value to the extent that it is mined to extract meaningful and actionable information....

“The more data, the better the algorithms. And the better the algorithms, the better the quality of service offered by Amazon, Facebook or Google and the other frontier firms. This is the positive feedback law of machine learning. Previous sources of market power have been conventional economies of scale and scope, augmented by patents (Xerox), network externalities (IBM) and government regulations and franchises (ATT). All of these still matter, of course, in the age of the internet. But machine learning as a source of competitive advantage adds another, technological driver....

(Janeway, Doing Capitalism, 2nd edition, p. 313)
“High Propensity Business Applications”

Unions and Inequality

“It is well-documented that, since at least the early twentieth century, **U.S. income inequality has varied inversely with union density**. But moving beyond this aggregate relationship has proven difficult, in part because of the absence of micro-level data on union membership prior to 1973. We develop a new source of micro-data on union membership, opinion polls primarily from Gallup (N 980,000), to look at the effects of unions on inequality from 1936 to the present. First, we present a new time series of household union membership from this period. Second, we use these data to show that, throughout this period, union density is inversely correlated with the relative skill of union members. When density was at its peak in the 1950s and 1960s, union members were relatively less-skilled, whereas today and in the pre-World War II period, union members are equally skilled as non-members. Third, we estimate union household income premiums over this same period, finding that despite large changes in union density and selection, the premium holds steady, at roughly 15–20 log points, over the past eighty years. Finally, we present a number of direct results that, across a variety of identifying assumptions, suggest unions have had a significant, equalizing effect on the income distribution over our long sample period.

US Inequality:
Top 1% versus Bottom 50%

(World Inequality Database, [https://wid.world/country/usa/](https://wid.world/country/usa/))
Market Power/Political Power
SCIENCE, TECHNOLOGY and INNOVATION

Whether it’s improving our health or harnessing clean energy, protecting our security or succeeding in the global economy, our future depends on reaffirming America’s role as the world’s engine of scientific discovery and technological innovation.

— President Barack Obama

FEATURED TOPICS

CLIMATE CHANGE:
Climate change represents one of the greatest

OPEN GOVERNMENT AND OPEN DATA:
The Obama Administration believes that responsible
In 1976, Congress established the White House Office of Science and Technology Policy (OSTP) to provide the President and others within the Executive Office of the President with advice on the scientific, engineering, and technological aspects of the economy, national security, homeland security, health, foreign relations, the environment, and the technological recovery and use of resources, among other topics.

OSTP also leads interagency science and technology policy coordination efforts, assists the Office of Management and Budget with an annual review and analysis of Federal research and development in budgets, and serves as a source of scientific and technological analysis and judgment for the President with respect to major policies, plans, and programs of the Federal Government.
“As President, I can put no other consideration before the wellbeing of American citizens. The Paris Climate Accord is simply the latest example of Washington entering into an agreement that disadvantages the United States to the exclusive benefit of other countries, leaving American workers — who I love — and taxpayers to absorb the cost in terms of lost jobs, lower wages, shuttered factories, and vastly diminished economic production.

“Thus, as of today, the United States will cease all implementation of the non-binding Paris Accord and the draconian financial and economic burdens the agreement imposes on our country. This includes ending the implementation of the nationally determined contribution and, very importantly, the Green Climate Fund which is costing the United States a vast fortune.”
Will China Lead?

China emerges as global climate leader in wake of Trump's triumph

With the US president-elect threatening to withdraw from the Paris Agreement, Beijing is ready to lead world’s climate efforts, reports Environment 360.
New Economic Thinking from the Citadels of New Cambridge

MIT

HARVARD

**Adaptive Markets**
Financial Evolution at the Speed of Thought
ANDREW W. LO

**A Crisis of Beliefs**
INVESTOR PSYCHOLOGY AND FINANCIAL FRAGILITY
NICOLA Gennaioli and Andrei Shleifer
The Power of Ideas

“Keynes concluded the General Theory with this contrast between the power of vested interests, as evident in his day as in ours, and the power of ideas:

I am sure that the power of vested interests is vastly exaggerated compared with the gradual encroachment of ideas. Not, indeed, immediately, but after a certain interval ... But, soon or late, it is ideas, not vested interests, that are dangerous for good or evil.

“The new economic ideas generated from the Financial Crisis and its economic consequences are dangerous for good. Most importantly, if we are to change the world, to reconfigure the American version of the Three-Player Game so that it can again generate positive outcomes, best that first we understand how it is structured and how it functions. So we invert Marx, whose gravestone reads: ‘The philosophers have only interpreted the world, in various ways. The point, however, is to change it.’ If we are to change the world, we must apply ourselves to interpreting it in all its messy reality.”

(Janeway, Doing Capitalism,, 2nd edition, p. xxxiv)