Venture Capital and the Economics of Innovation

Lecture 7

The Digital Revolution and the State

Mission R&D *versus* Market failure and the "[Vannevar] Bush Social Contract"

"**Defense-related R&D is an example of "mission R&D,"** that is, R&D funded by public agencies to support their activities. Despite its significance…, this class of R&D is largely overlooked by the welfare economics of R&D….

"**Although the market failure rationale retains great rhetorical influence in justifying public investments in R&D programs, casual empiricism suggests that it influence over such public investments is modest**…. 'Market failure' underpins less than 50% of public R&D spending in most [OECD] economies.

"…Rather than 'scientists' choosing the fields in which large investments of public R&D funds were made, allocation decisions were based on assessments by policymakers of the research needs of specific agency missions ranging from national defense to agriculture….To a surprising extent, **scholarly analysis of the 'new context' of science and technology policy fails to acknowledge the prominence of mission-oriented R&D programs** that have few of the hallmarks of the idealized 'Bush Social Contract.'"

(D. C. Mowery, "Military R&D and Innovation," in Hall and Rosenberg, pp. 1221-3)

Nonmarket Character of Military R&D and Procurement

"**…[M]ilitary R&D and procurement can scarcely be described or analyzed as market-based activities**. Rather than competing firms serving markets of autonomous consumers or firms, whose independent purchase decisions influence price, profitability, entry and exit, military R&D and related transactions involve limited competition among a small number of firms selling to a single customer. **The operation of competitive forces within this arena is managed by the buyer**.

"**The nonmarket character of military R&D and procurement…has another important implication….The 'output'…is not captured by conventional measures of national income, which measures only the inputs to these programs**….Improvements in the 'productivity' or performance of the defense sector that flow from innovation or other sources are not measured. This measurement difficulty is not unique to national defense…."

(Mowery, p. 1235)

Consequences of Federal Financing of IT

"One of the most important long-term consequences of federal financing of innovation in IT was the creation of **a relatively weak intellectual property rights environment** and, in some cases, **the direct encouragement of interfirm technology diffusion by federal agencies**….**Federal funding for procurement of the products of these new industries also encouraged the entry of new firms and interfirm technology diffusion**. In addition, federal procurement supported **the rapid attainment by supplier firms of relatively large production runs**, enabling faster rates of improvement in product quality and cost than would otherwise have been realized. Finally, federal support for innovation in IT contributed to **the creation of a large-scale R&D infrastructure in federal laboratories and, especially, in U.S. universities**…."

(K. R. Fabrizio and Mowery, D., "The Federal Role in Financing Major Innovations: Information Technology during the Postwar Period," in Lamoreaux and Sokoloff, pp. 286-7)

Defense Funding of Computer R&D

"**From the earliest days of their support for the development of computer technology, the U.S. armed forces supported wide diffusion of technical information on this innovation**. This attitude, which contrasted with that of the military in Great Britain or the Soviet Union, appears to have stemmed from the U.S. military's concern that a substantial industry and research infrastructure would be required for the development and exploitation of computer technology….**The technical plans for the military-sponsored IAS computer developed by von Neumann at Princeton's Institute for Advanced Study were widely circulated and spawned a number of clones**…Public funding supported research on many problems that might not have been supported from private sources, consistent with the market-failure analysis discussed above, but equally important was the relatively liberal dissemination of this publicly supported research.

"…[F]ederal funds accounted for 59 percent of …computer-related R&D spending…between 1949 and 1959."

(Fabrizio and Mowery, p. 295)

Defense Funding of Semiconductor R&D

"…[B]y 1953, the U.S. Defense Department was funding pilot transistor production lines….[**F]ederally supported R&D accounted for nearly 25 percent of total industry R&D spending in the late 1950s**.

"…[T]he bulk of this federal R&D…was allocated to established producers of electronic components**….[N]ew firms…received only 22 percent of federal R&D contracts in 1959, although these firms accounted for 63 percent of semiconductor sales** in that year. The major corporate recipients of military R&D contracts were not among the pioneers in the introduction of innovations in semiconductor technology, while the pioneering firms did so without military R&D contracts. **Defense procurement contracts proved to be at least as important as public funding of R&D in shaping this nascent industry.**"

(Fabrizio and Mowery, p.p. 289-90, emphasis added)

The SAGE Air Defense Network

"**IBM's technology developments efforts benefited from the firm's experience as supplier of more than fifty large computers for the SAGE air defense network** that was developed under the supervision of MIT's Lincoln Laboratories in the 1950s….

"…[T]he RAND corporation was the contractor responsible for the bulk of the huge amount of software required for SAGE. RAND in turn created the Software Development Division to produce the software. This division separated from RAND, forming the Systems Development Corporation in 1956. Since large-scale software development projects of this sort were well beyond the technological or scientific frontier of academic computer science (a discipline that itself scarcely existed in the early 1950s), **the SAGE software development project acted as a 'university' of sorts for hundreds of software programmers, laying the foundations for the software industry's future development within the United States**…."

(Fabrizio and Mowery, p. 297, 301)

Federal Funding of Computer Science

"**During the 1970s and 1980ss, roughly 75 percent of the mathematics and computer science research performed at universities was funded by the federal government….[F]ederal investments in computer science research increased fivefold from $180 million in 1976 to $960 million in 1995 in constant (1995) dollars. Federally funded basic research in computer science, roughly 70 percent of which was performed in U.S universities, grew from $65 million in 1976 to $265 million in 1995**….The defense share of federal computer science research funding declined from almost 60 percent in fiscal 1986 to less than 30 percent in fiscal 1990…and defense funding of computer science research in universities appears to have been supplanted somewhat by the growth in funding for quasi-academic research and training organizations."

(Fabrizio and Mowery, pp. 298-9)

A Different Kind of State Intervention

"[**A} different sort of intervention by the American state in the market economy…was action by the Anti-Trust Division of the Department of Justice affecting two of the primary sources of technological innovation: IBM and AT&T**. IBM's monopoly of the punched cards used in its pre-computer data processing machines had been ended by a consent decree in 1936. In 1959, a second consent decree required that IBM agree to sell its products rather than make them available only on lease....**But the most important event occurred in 1969. When the Justice Department launched a third assault…, IBM preemptively responded by unbundling software from its computers**. The creation of an independent software industry followed.

As for AT&T, its position as the monopoly provider of long distance telephone service had been established in 1913 by the Kingsbury Commitment, whereby the company agreed to allow independent phone companies to connect to its network and to deliver "universal service" across the country. **In 1956, a consent decree with the Justice Department confirmed the Kingsbury Commitment, but the price was AT&T's agreement to restrict its activities to the regulated business of the national telephone system**. The Anti-Trust Division's focus on AT&T eventually led, in 1982, to the break-up of AT&T. But, in the meantime, **the result of the 1956 agreement was that AT&T broadly licensed a range of powerful innovations that were applicable to the emerging computer industry**…"

(Janeway, *Doing Capitalism* 2nd ed., pp. 122-3)

1980-1983: All Change

- Intel Refuses to Participate in VHSIC Program
- 9/1981: IBM Introduces PC with Wintel Inside
- 1982: Relational Software Renames Itself Oracle
- Ada flops as a standard software language
- “Vertical Computer Industry” Starts Transition to “Horizontal”
- Interest Rates Fall/the Great Bull Market Begins
- 1983: The IPO Market Returns

Competition in Computing Platforms

"**The direction of innovative opportunities is shaped by the relationship between firms, and those relationships are shaped by the presence of platforms. In any given era, computing markets are organized around platforms—a cluster of technically standardized components that buyers use together to perform…applications**.

"Such platforms involve long-lived assets, namely, both components sold in markets (i.e., hardware and some software) and investments made by buyers (i.e., training and most software)….

"Platforms display a form of increasing returns that is sometimes given the labels 'network effect' or 'bandwagon effect.' That is, the value of participating in the platform grows as more participants commit to it….

Until the early 1990s, platforms helped define the margins between most market segments….Mainframe, minicomputers, workstations, and PCs in decreasing order, constituted different size-based market segments."

(S. Greenstein, "Innovative Conduct in Computing and Internet Markets," in Hall and Rosenberg, pp. 488-9)

Distributed Computing: Client-Server to Internet

"**The networking and Internet revolution of the 1990s is responsible for blurring prior familiar distinctions. At first, these new technologies involved a combination of workstations and PCs hooked together with a local area network**….

"**Before client-server systems completely diffused to all enterprises, another innovation altered the path of development: the Internet**….

"There were many new features to the commercial Internet, but two features especially stood out….**First, the Internet was designed to have its intelligence at the end of the network**….

Second,…**the Internet made it possible for users and vendors to move data across vast geographic distances without much cost**….Together, those two features enabled enormous combinations of users and suppliers of data that previously would have required bilateral—and therefore, prohibitively costly—agreements to arrange…."

(Greenstein, pp. 489-90)

Privatization of the Internet

"Management for large parts of the Internet were transferred to the NSF in the mid-1980s….

"**By the early 1990s, the NSF had developed a plan to transfer ownership of the Internet**…into the private sector. The plan for privatization was motivated by several factors. …[I]t was forecast (correctly) that a privatized Internet would be more efficient…, leading to lower costs for all users. There was also a concern that the NSF could not fund indefinitely the operations of the Internet**….[S]everal of the private providers of data services were chafing under the NSF's 'acceptable use' policy, forbidding them to use government-owned assets for commercial purposes**. Complete privatization would also remove this issue."

(Greenstein, p, 507)

From ARPAnet to Internet: The Importance of TCP/IP

"… **[T]he explosive adoption and commercial exploitation of the Internet during the 1990s built on a foundation of computer-networking R&D and investment, much of which was from federal sources**….

"…ARPAnet is widely recognized as the earliest forerunner of the Internet….

"In 1974, two DARPA-funded engineers…published the first version of the TCP/IP protocol suite. The new…protocol allowed physically distinct networks to interconnect with each other as 'peers' and exchange packets through special hardware…'gateways.'…

"**TCP/IP's origins in a federally funded research project…were crucial to the eventual victory of this open, nonproprietary standard….The weak intellectual property protection for TCP/IP…reflected the network's academic origins, the DOD's support for placing research in the public domain, and the inability of proprietary standards to compete with the open TCP/IP standard. The resulting widespread diffusion of the Internet's core technological innovations lowered barriers to the entry by networking forms in hardware, software and services.**"

(Fabrizio and Mowery, pp. 305-6)

From ARPAnet to Internet: The Importance of HTML, HTTP and the WWW

"**In May 1991,…two physicists working at the CERN laboratory in Switzerland, released a new document format, hyper-text markup language (HTML), and an accompanying document retrieval protocol, hyper-text transfer protocol (HTTP)**. Together, HTML and HTTP turned the Internet into a vast cross-referenced collection of multimedia documents, dubbed by these collaborators the World Wide Web (WWW). In order to use the WWW, a computer need a connection to the Internet and the application software that could retrieve and display HTML documents. Although it was not the first functional Internet browser, Mosaic, a free program written by a group of graduate students at the University of Illinois National Center for Supercomputing Applications…was widely adopted and accelerated the growth of the Web….**The gold rush of Internet commercialization and hype had begun**…."

(Fabrizio and Mowery, pp. 307-9)

Distinctive Characteristics of the Internet Era

"**Three factors distinguish the Internet era from prior ones**. First, t**he division of technical leadership cut across a wider array of activities than such prior innovative episodes as with the PC and the LAN**….Firms that had little economic relationship to one another prior to the Internet…such as cable companies and…Cisco, or new firms like CNN and a portal like Yahoo, found themselves making deals and basing their growth projections on the outcomes of these deals….

"**The second distinguishing characteristic came from the new organizational forms for designing standards in advance of deploying equipment…The Open Source movement was part of this change**…

"**The third novel aspect of the commercial Internet involved its breath of potential applications**….

"The combination of all three aspects perhaps led to the biggest surprise, widespread exploration by many players in a great many more applications than have seemed possible or likely only a decade earlier…."

(Greenstein, pp. 527-8)

The Digital Revolution Today

"…[S]ince the collapse of the great Internet Bubble, the relationship between the IT sector and the state has been reversed. Dependent on state support of research and procurement through its growth to maturity, the IT sector has now fostered a full-fledged digital revolution, comparable in scale and scope to the consequences of the railroads and of electrification….**No longer solely functioning as collaborative partners with government in an extended process of invention and deployment, those at the forefront of the digital revolution are challenging the state at both micro and macro levels**.

"**At the micro-level of individual firms addressing specific markets, the confrontation is deliberate**. As always, the innovators are setting out to disrupt established markets and destroy the incumbents who occupy them: to do so, they must over-ride the ecosystem of state-sanctioned and state-enforced rules that co-evolved with the markets and without which the markets could not have functioned….**At the macro-level, digitalization has powered the triple forces of automation, globalization, and financialization to drive the increasingly unequal distribution of income and wealth**."

(Janeway, *Doing Capitalism* (2^{nd} ed.), p. 294)

From Atoms to Bits

"**When a search is conducted on Google**, the work of finding relevant information by consulting physical repositories of information, with or without the additional work of a librarian, has been replaced: **atoms have become bits**. **When a consumer buys a book on Amazon**, massive economies of scale are deployed to reduce the aggregate work previously distributed across multiple supply chains: **atoms have become bits**. **When a designer uses a software program to specify the characteristics of a prototype for submission to a 3D printer**, the work of hand-crafting a model has been replaced: **atoms have come bits**. **When a random customer requests transportation through Uber or overnight accommodation through Airbnb** and the request is fulfilled by one of many possible suppliers, the work of physically matching demand and supply has been replaced: **atoms have become bits**.

"**To the extent that delivery of the service remains within the digital domain, consumption of the service is as free of *technological* friction as its development and deployment**…."

(Janeway, *Doing Capitalism,* 2nd ed., p. 296.)

Frictions Remain

"**Economic Frictions**: Just because each local market is subject to the same disruptive competition does not mean that existing service providers will be displaced with equal ease. In relatively more concentrated markets, for example, oligopolistic service providers have more to lose and greater resources with which to resist….

"**Regulatory Frictions**: Market imperfections are more resistant to competitive disruption when they have been embedded in regulations….

"**Cultural Frictions**: A prime example is represented by the extreme range of responses to Uber's penetration of different local markets reflected in the extent to which it is subject to regulatory restrictions, up to and including outright bans. Taxi drivers in San Francisco are not the same as "black cab" drivers in London….

"…[Another] source of confrontation with the state…is the legal status of people whose livelihoods are dependent upon the digital platform companies which, in turn, deal with them as independent contractors…."

(Janeway, *Doing Capitalism*, pp. 297-8.)

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….

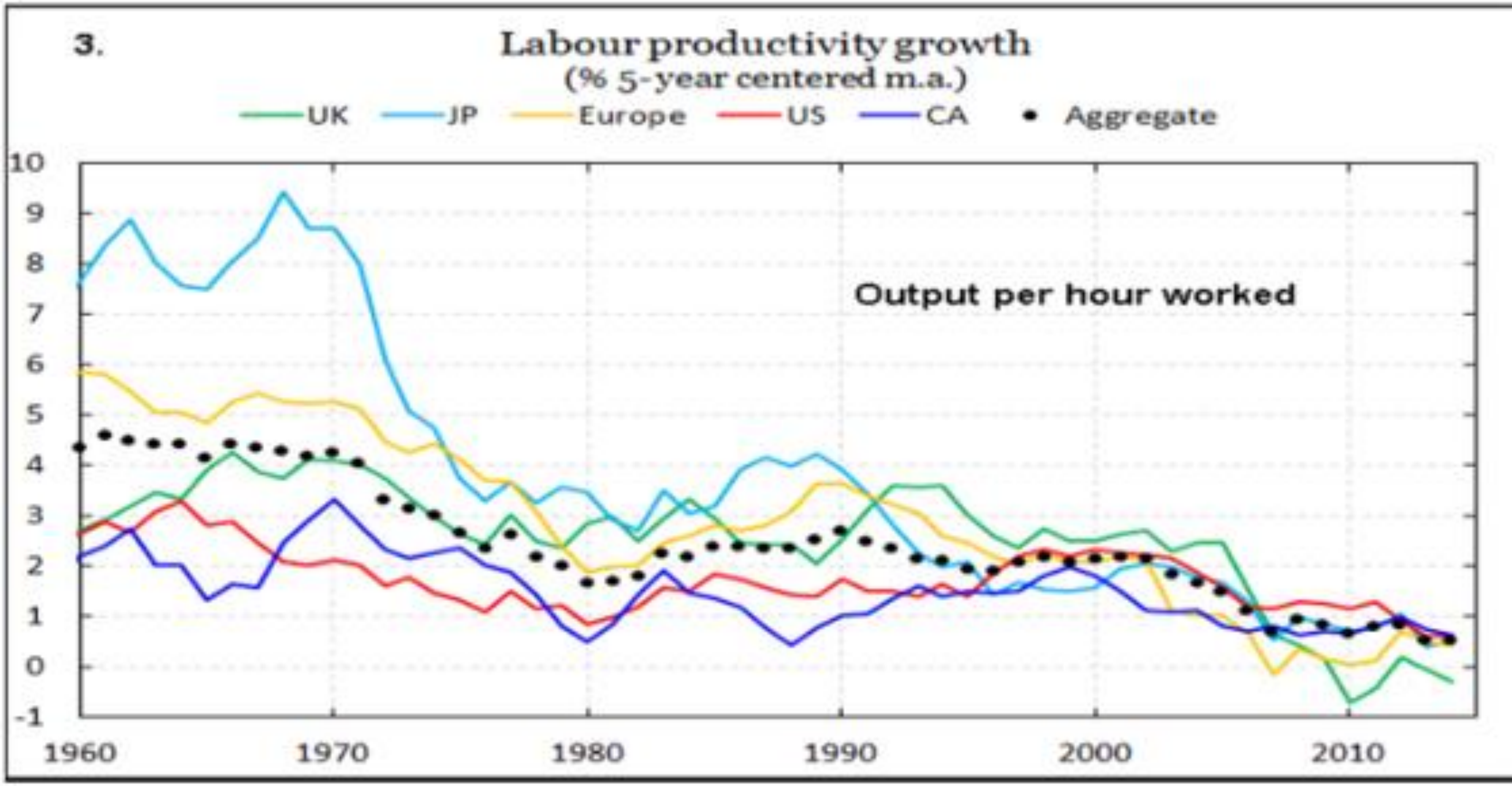
"So here is the double, paradoxical hypothesis…. **The second half of the Digital Revolution…will see the productivity of the Rest rise. But even as average productivity emerges from its slump, the Best will continue to maintain, perhaps widen further, their already enormous lead**."

(Janeway, *Doing* Capitalism, 2nd ed., p. 313)

Machine Learning…

is Money Laundering for Bias

The Productivity Puzzle



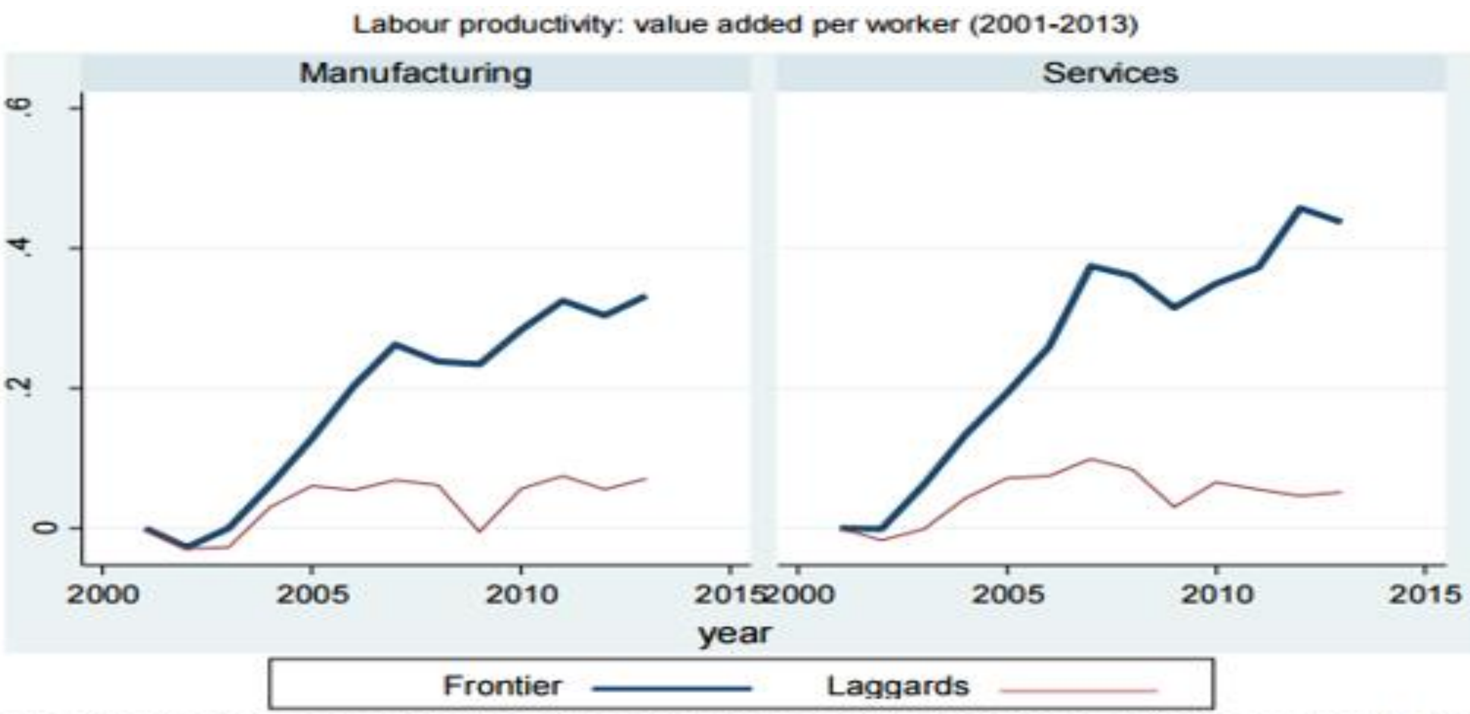
Gavyn Davis, "Is Economic Growth Permanently Lower?" available at https://www.ft.com/content/3822867f-85bf-33a2-85a5-4a40974d7d9e

Mismeasurement?

"My evaluation focuses on four pieces of evidence that pose challenges for mismeasurement-based explanations for the productivity slowdown that the US economy has been experiencing since 2004. **Two patterns—the size of the slowdown across countries is uncorrelated with the information and communications technology intensities of those countries' economies, and the GDI–GDP gap began opening before the slowdown and in any case reflects capital income growth—are flatly inconsistent with the implications of the mismeasurement hypothesis. Two others—the modest size of the existing literature's estimates of surplus from internet-linked products and the large implied missing growth rates of digital technology industries that the mismeasurement hypothesis would entail—show the quantitative hurdles the hypothesis must clear** to account for a substantial share of what is an enormous amount of measured output lost to the slowdown (around $9,300 per person per year).

(C. Syverson, "Challenges to Mismeasurement Explanations for the US Productivity Slowdown," *Journal of Economic Perspectives*, 31:2, Spring 2017, pp. 182-3)

The Best versus the Rest: OECD

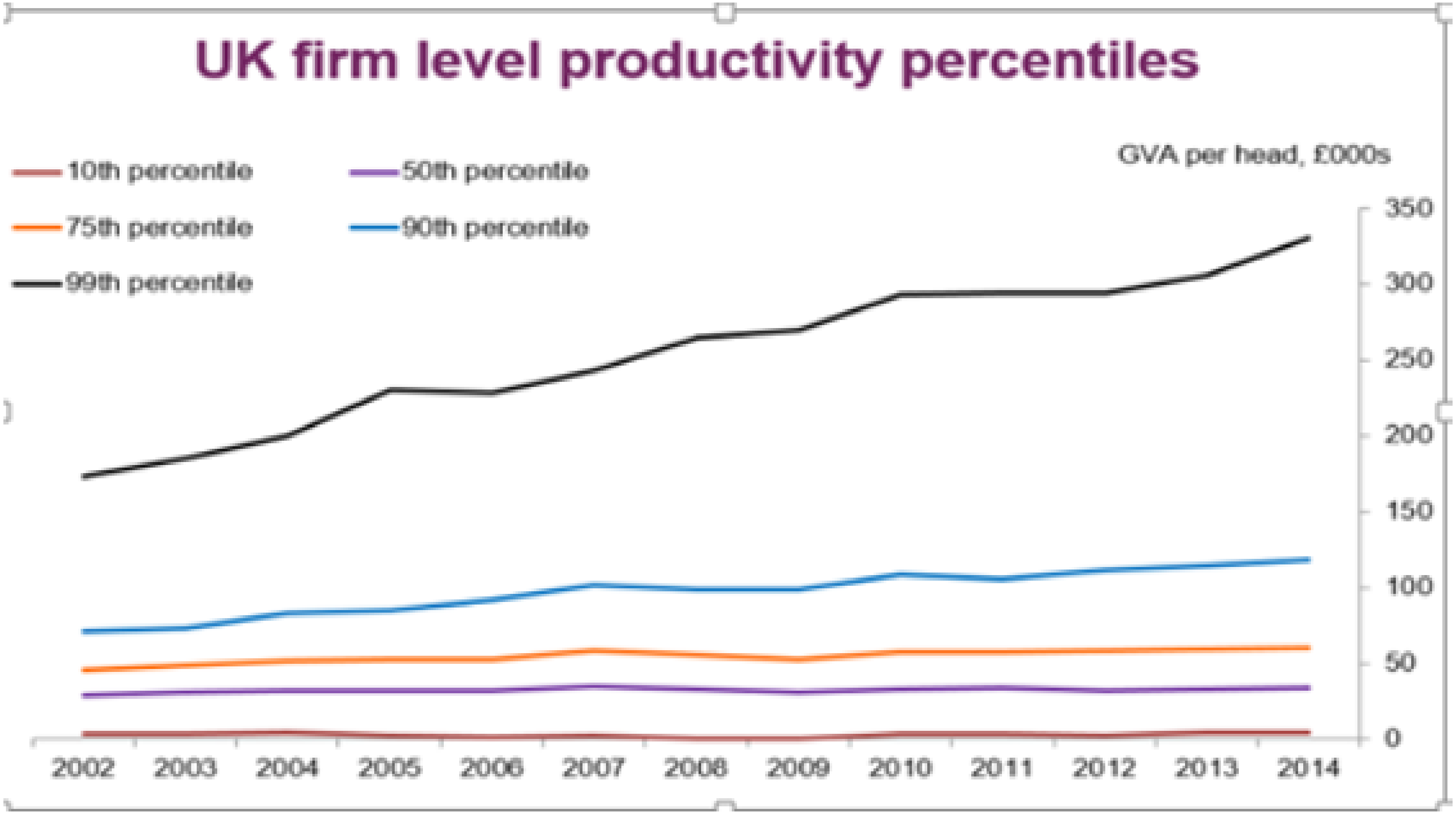


Notes: the global frontier is measured by the average of log labour productivity for the top 5% of companies with the highest productivity levels within each 2-digit industry. Laggards capture the average log productivity of all the other firms. Unweighted averages across 2-digit industries are shown for manufacturing and services, normalized to 0 in the starting year. The time period is 2001-2013. The vertical axes represent log-differences from the starting year: for instance, the frontier in manufacturing has a value of about 0.3 in the final year, which corresponds to approximately 30% higher in productivity in 2013 compared to 2001. Services refer to non-financial business sector services. See details in Section 3.3.

Source: Authors' calculations based on the recent update of the OECD-Orbis productivity database (Gal, 2013).

D. Andrews, Criscuolo C., and P. N. Gal, "The Best versus the Rest: the Global Productivity Slowdown, Divergence across Firms and the Role of Public Policy," OECD, December 2016, available at http://www.oecd-ilibrary.org/economics/the-best-versus-the-rest_63629cc9-en;jsessionid=9ag8ukcclm7fb.x-oecd-live-03

The Best versus the Rest: UK



(Source: A. Haldane, Bank of England)

“Intangibles” and the Productivity Slowdown

“Productivity growth has stagnated over the past decade. **This paper argues that the rise of intangible inputs (such as information technology) can cause a slowdown of growth through the effect it has on production and competition**. I hypothesize that **intangibles create a shift from variable costs to endogenous fixed costs**, and use a new measure to show that the share of fixed costs in total costs rises when firms increase ICT and software investments. I then develop a quantitative framework in which **intangibles reduce marginal costs and endogenously raise fixed costs, which gives firms with low adoption costs a competitive advantage**. This advantage can be used to deter other firms from entering new markets and from developing higher quality products. **Paradoxically, the presence of firms with high levels of intangibles can therefore reduce the rate of creative destruction and innovation**. I calibrate the model using administrative data on the universe of French firms and find that, after initially boosting productivity, the rise of intangibles causes a 0.6 percentage point decline in long-term productivity growth. **The model further predicts a decline in business dynamism, a fall in the labor share and an increase in markups, though markups overstate the increase in firm profits**.

(M. de Ridder, “Market Power and Innovation in the Intangible Economy,” November 2019, Abstract, available at http://www.maartenderidder.com/uploads/6/2/2/3/6223410/maarten_de_ridder_jmp.pdf

The Productivity Slowdown: Alternative Hypotheses

- *Hypothesis of Much Ado about Nothing*
- *Hypothesis of Decreasing Domestic Competition*
- *Hypothesis of the Rise of Superstar Firms*
- *Hypothesis of Lower Search Costs*
- *Hypothesis of Globalization*
- *Hypothesis of Intangible Assets*

"**Two hypotheses can explain increasing concentration and increasing profit margins—the *Rise of Superstar Firms* and *Decreasing Domestic Competition*****….**

(T. Philippon, *The Great Reversal: How America Gave up on Free Markets* (Harvard Belknap Press, Cambridge MA, 2019), 48-49, 61, 79)

Declining Competition v Rising Superstars

"**The pattern of investment and productivity growth is inconsistent with the hypothesis of rising superstar firms**, which hold efficiency gains to be the root cause of increasing concentration. **If concentration gains were reflective of increasing efficiency, then we should see more productivity growth in places where concentration increases. We saw some of it during the 1990s, but the opposite happened during the 2000s**. The evolution of productivity is consistent with the investment choices that firms make. **Industry leaders' shares of investment and capital have decreased, and their profit margins have increased. Given that the leaders in concentrating industries do not feel the urge to invest and choose to increase their payouts to shareholders, it is hardly surprising that productivity growth is lackluster**.

(T. Philippon, *The Great Reversal: How America Gave up on Free Markets* (Belknap/Harvard University Press, Cambridge MA, 2019), p. 79)

Reduction in Knowledge Diffusion

"Reduction in knowledge diffusion is able to account for these trends as follows. **When knowledge diffusion slows down over time, as a direct effect, market leaders are shielded from being copied, which helps them establish stronger market power. When market leaders have a bigger lead over their rivals, the followers get discouraged; hence, they slow down. The productivity gap between leaders and followers opens up**. The first implication of this widening is that **market composition shifts to more concentrated sectors**. Second, **limit pricing allows stronger leaders (leaders further ahead) to charge higher markups**, which also increases the profit share and decreases the labor share of gross domestic product (GDP). Since entrants are forward looking, they observe the strengthening of incumbents and get discouraged; therefore, entry goes down. **Discouraged followers and entrants lower the competitive pressure on the market leader: When they face less threat, market leaders relax and they experiment less. Hence, overall dynamism and experimentation decrease in the economy**.

(U. Akcigit and Ates. S. T., "What Happened to U.S. Business Dynamism?" NBER Working Paper 25756, May 2019, pp. 3-4.)

Potential Impact of Automation

Technical automation potential

~50%
of current work activities are technically automatable by adapting currently demonstrated technologies.

6 of 10
current occupations have more than **30%** of activities that are technically automatable

Impact of adoption by 2030[1]

% of workers (FTEs[2])	Slowest	Midpoint	Fastest
Work potentially displaced by adoption of automation, by adoption scenario	**0%** (10 million)	15% (400 million)	**30%** (800 million)
Workforce that could need to change occupational category, by adoption scenario[3]	**0%** (<10 million)	3% (75 million)	**14%** (375 million)

Impact of demand for work by 2030 from 7 select trends[4]

% of workers (FTEs)	Low	High
Trendline demand scenario	**15%** (390 million)	**22%** (590 million)
Step-up demand scenario	**6%** (165 million)	**11%** (300 million)
Total	**21%** (555 million)	**33%** (890 million)

In addition, of the 2030 workforce of 2.66 billion, 8–9% will be in new occupations[5]

1 "Slowest" and "fastest" adoption refer to the two extremes of the scenario range we used in our automation adoption modeling, the latest and earliest scenarios, respectively. See Chapter 1 for details.
2 Full-time equivalents.
3 In trendline labor-demand scenario.
4 Rising incomes; health care from aging; investment in technology, infrastructure, and buildings; energy transitions; and marketization of unpaid work. Not exhaustive.
5 See Jeffrey Lin, "Technological adaptation, cities, and new work," *Review of Economics and Statistics*, volume 93, number 2, May 2011.

SOURCE: McKinsey Global Institute analysis

Algorithmic Management in the Workplace

February 2019

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Contents

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datasociety.net

“Conservatives Should Ensure Workers a Seat at the Table”

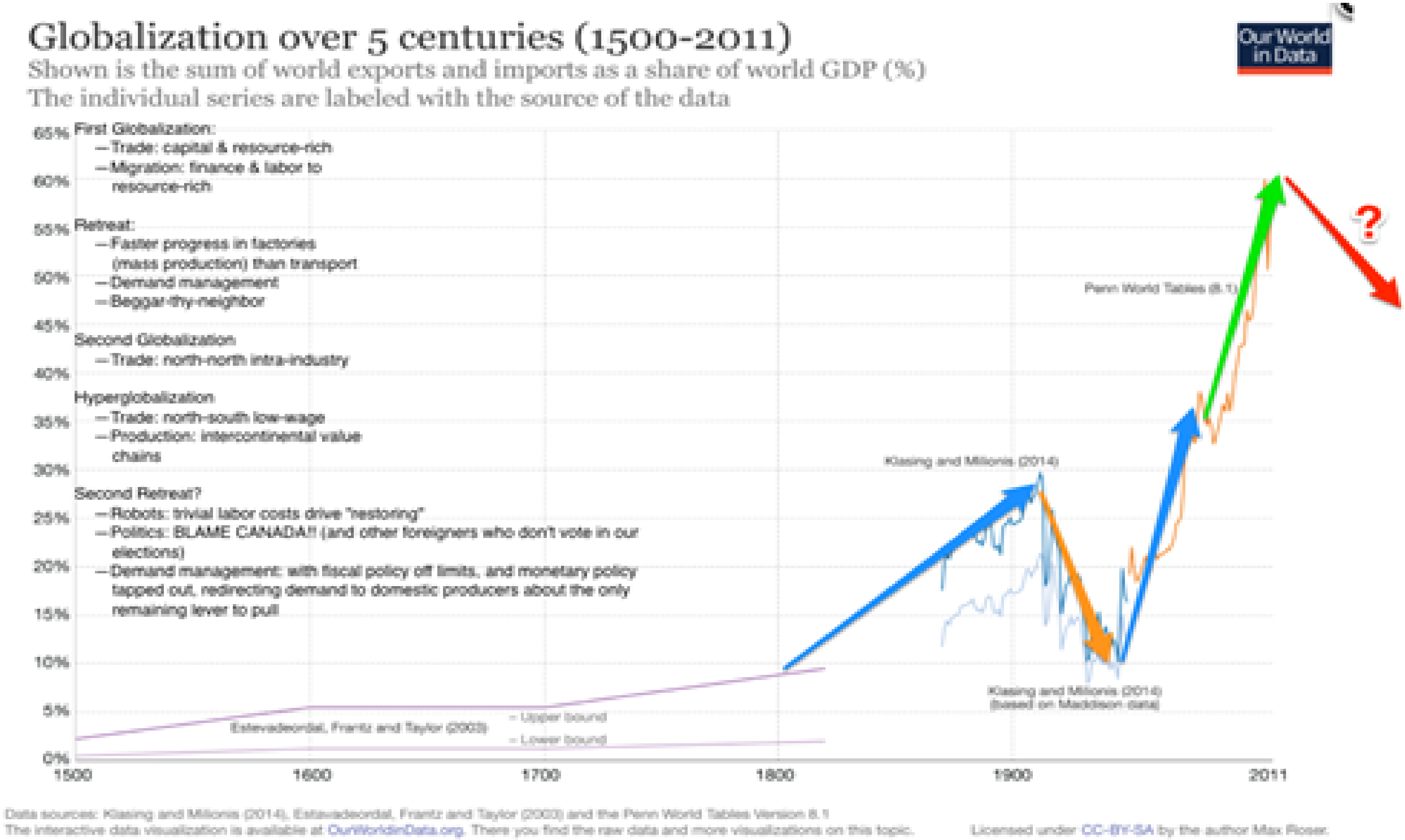
“American conservatives rightly place economic freedom and limited government among our dearest values. The defense of *markets*, though, has at times made us overly solicitous of *businesses*. As we advocate for owners and managers in their pursuit of profit, and celebrate the enormous benefits their efforts can generate for us all, **we must accord the same respect to the concerns of workers and ensure that they too have a seat at the table**...

“Institutions of organized labor have traditionally been the mechanism by which workers take collective action and gain representation and bargaining power in the private sector…. **Rather than cheer the demise of a once-valuable institution, conservatives should seek reform and reinvigoration of the laws that govern organizing and collective bargaining**…”

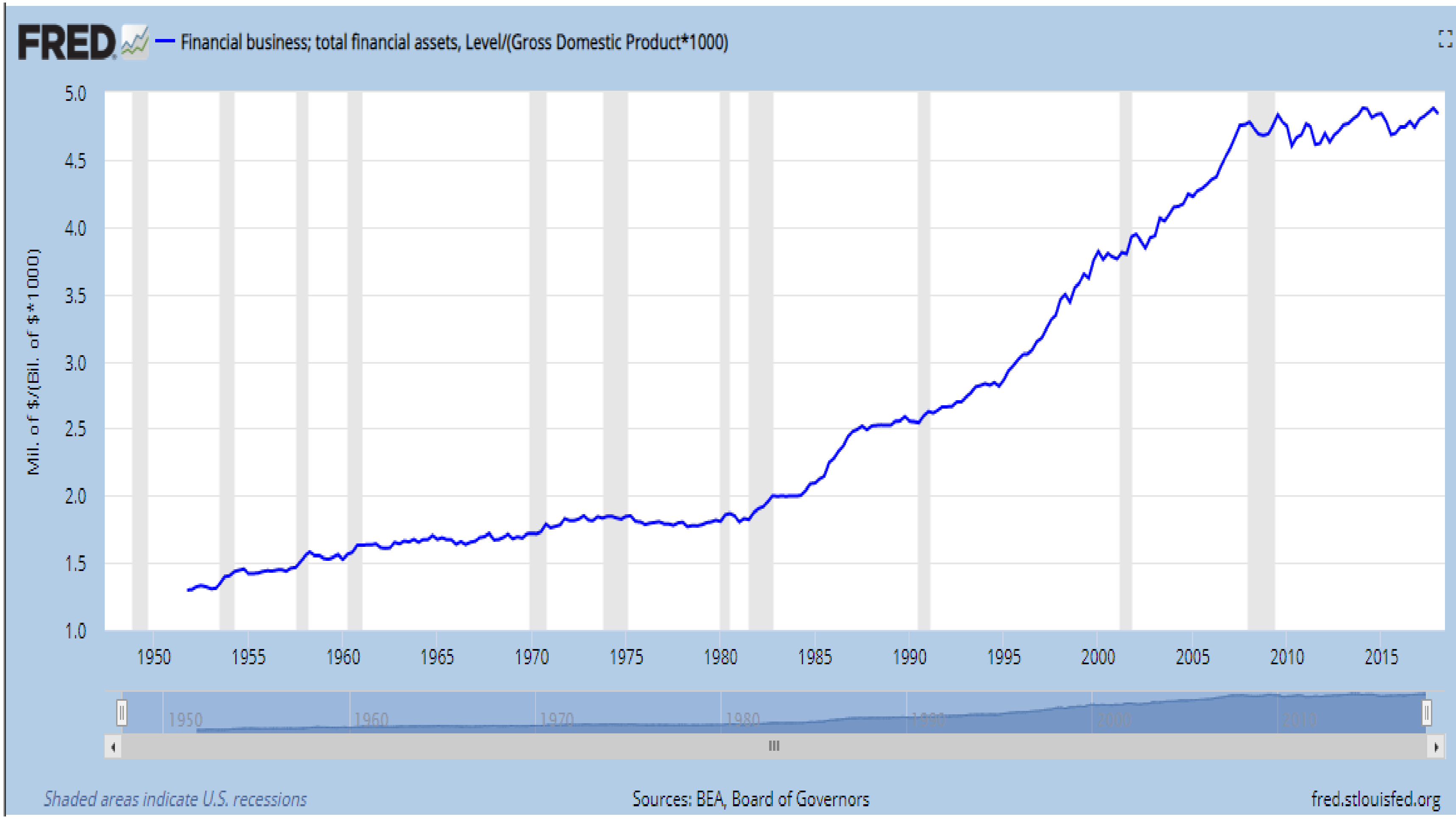
(American Compass, September 6, 2020)

The Two (Modern) Globalizations

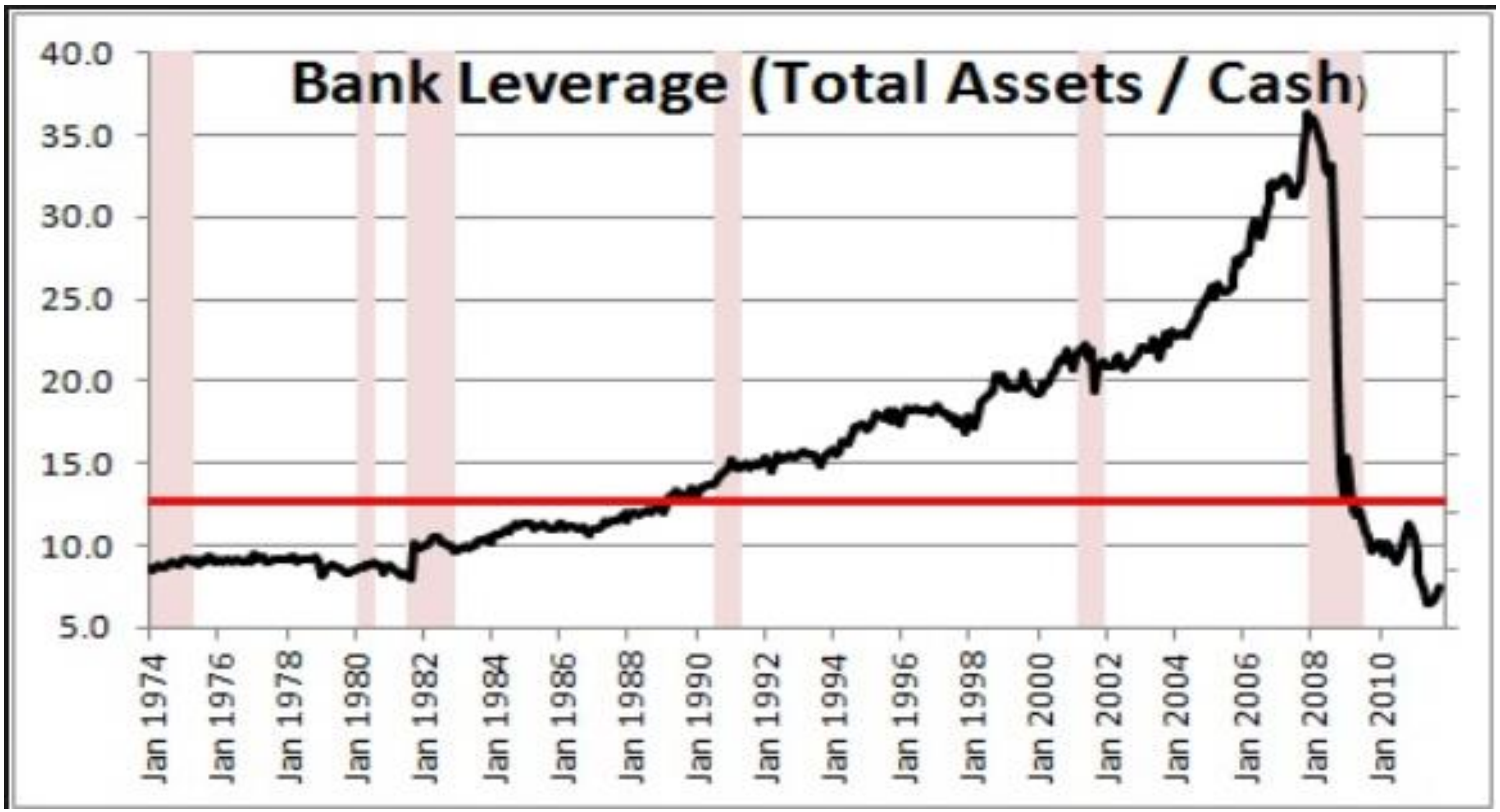
Courtesy of Brad Delong:



Financialization: I



Bank Capital



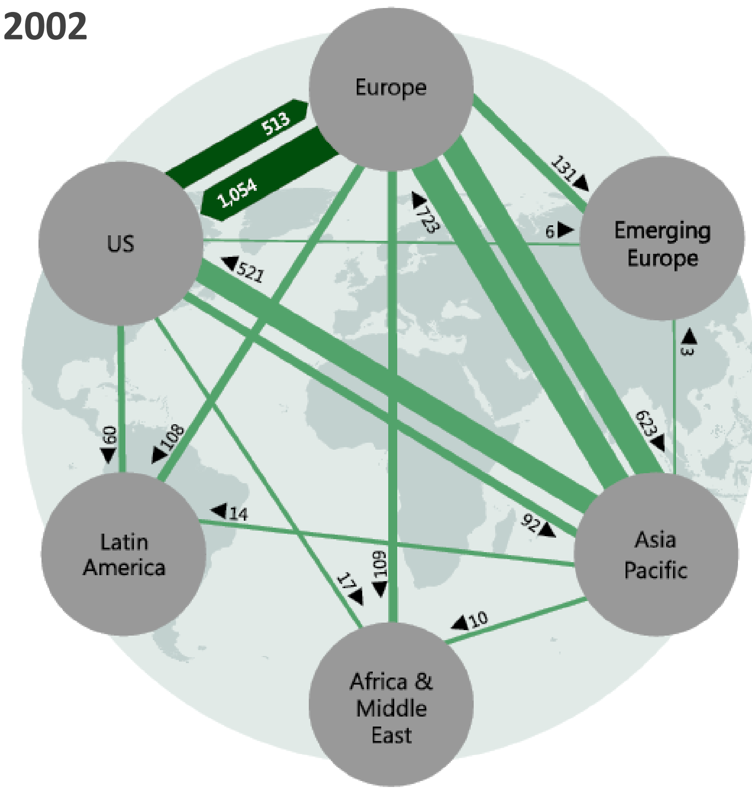
Source: http://www.pragcap.com/could-the-fed-have-avoided-2008/

Financialization: III

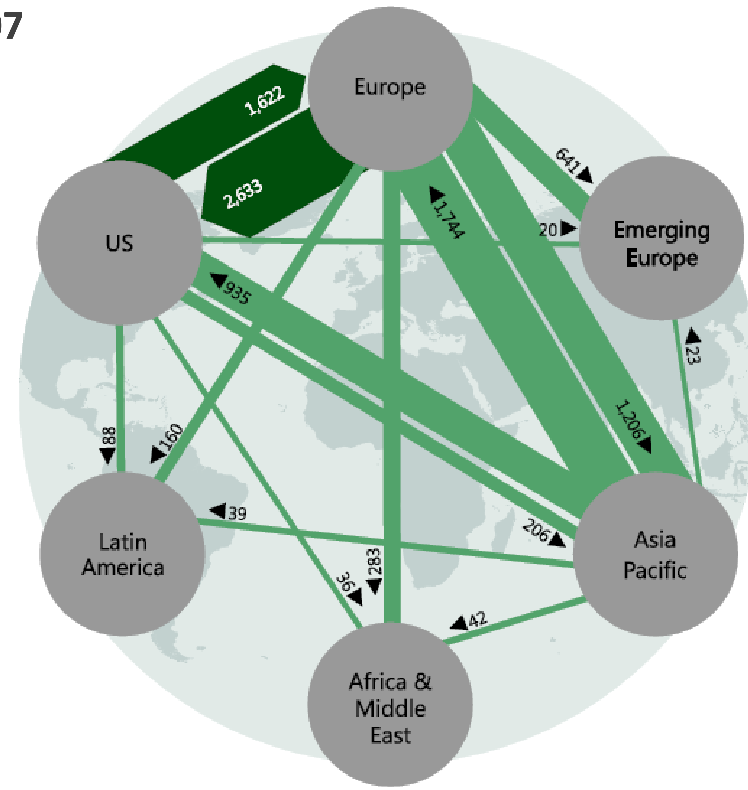
Cross-border Bank Claims (denominated in all currencies)[1]

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.

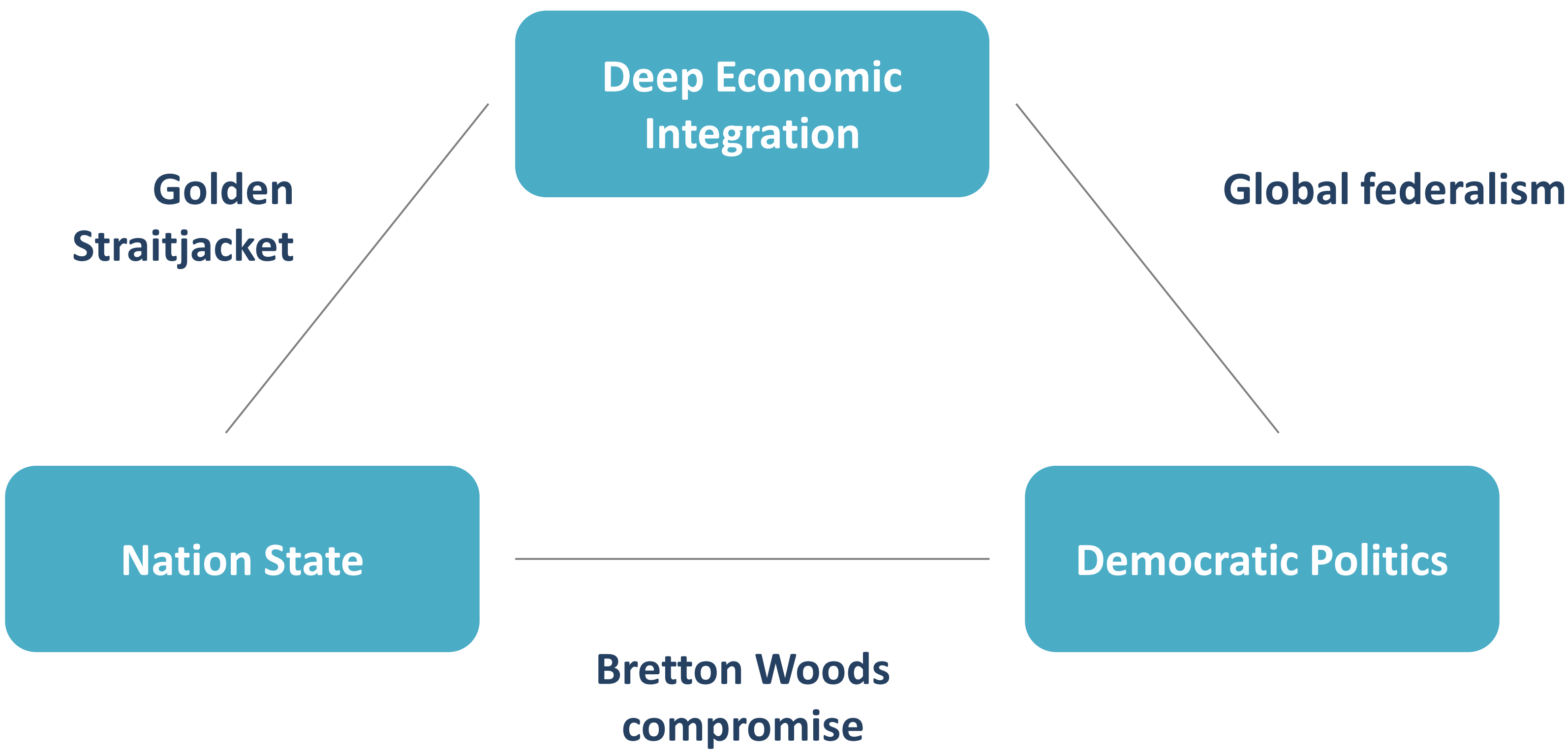
Efficiency *versus* Stability

"…[E]xcessive capital flows, especially if they are in the form of short-term debt, can reverse abruptly and plunge whole economies into difficulties. An economy is most prone to the hidden buildup of imbalances when measured volatility is low; a phenomenon known as the *volatility paradox*. Counterintuitively, **financial deepening via a partial removal of financial frictions may actually increase financial instability by facilitating excessive capital flows**. This calls for a carefully thought through macroprudential regulation of financial markets."

(M. K. Brunnermeier, James. H., and Landau, J. P., *The Euro and the Battle of Ideas* (Princeton University Press, 2017)

The Political Trilemma

The Political Trilemma of the World Economy



(D. Rodrik, *The Globalization Paradox: Why Global Markets, States, and Democracy Can't Coexist* (New York: Norton, 2011)

The Digital Challenge to the Political Process

"Beyond the economic consequences of digitalization and their direct spillovers into the political arena, a new front in confrontation with the state has been opened for the digital media companies, much as they may seek to evade it. It concerns **the problematic integrity of the underlying political process on which the authority of the state rests**. There is, of course, a long history of the use and abuse of the power of the press for political ends: from the first contested U.S. presidential election of 1800, distinguished by the vituperous falsehoods of the partisan press, through William Randolph Hearst's asserted responsibility for the Spanish-American War to the role of Fox News in the polarization of politics over the past twenty years. But **digital media has a unique power of simultaneous polarization and amplification through its narrow-casting focus and its friction-free powers of response and distribution**. The sheer volume of digital communications renders the task of filtering and validating what is posted technically impossible in the limit. In the evolving aftermath of the 2016 presidential election, however, **those responsible economically for these new channels may expect to be held responsible politically for the content they disseminate**.

(Janeway, *Doing Capitalism,* 2nd ed., p. 316.)

The Digital Revolution and the State: The Inverted Relationship

"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 as their participants operate under conditions of radical uncertainty."

(Janeway, *Doing Capitalism,* 2^{nd} ed., p. 316)