



# US Brain Drain and AI solutions

## PCBE Presentation

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# Brain Drain

- What - Fewer students

The US is facing a brain drain with declining domestic college enrollment and foreign scientists choosing to relocate to other countries. A positive scientific inflow has turned to an outflow.

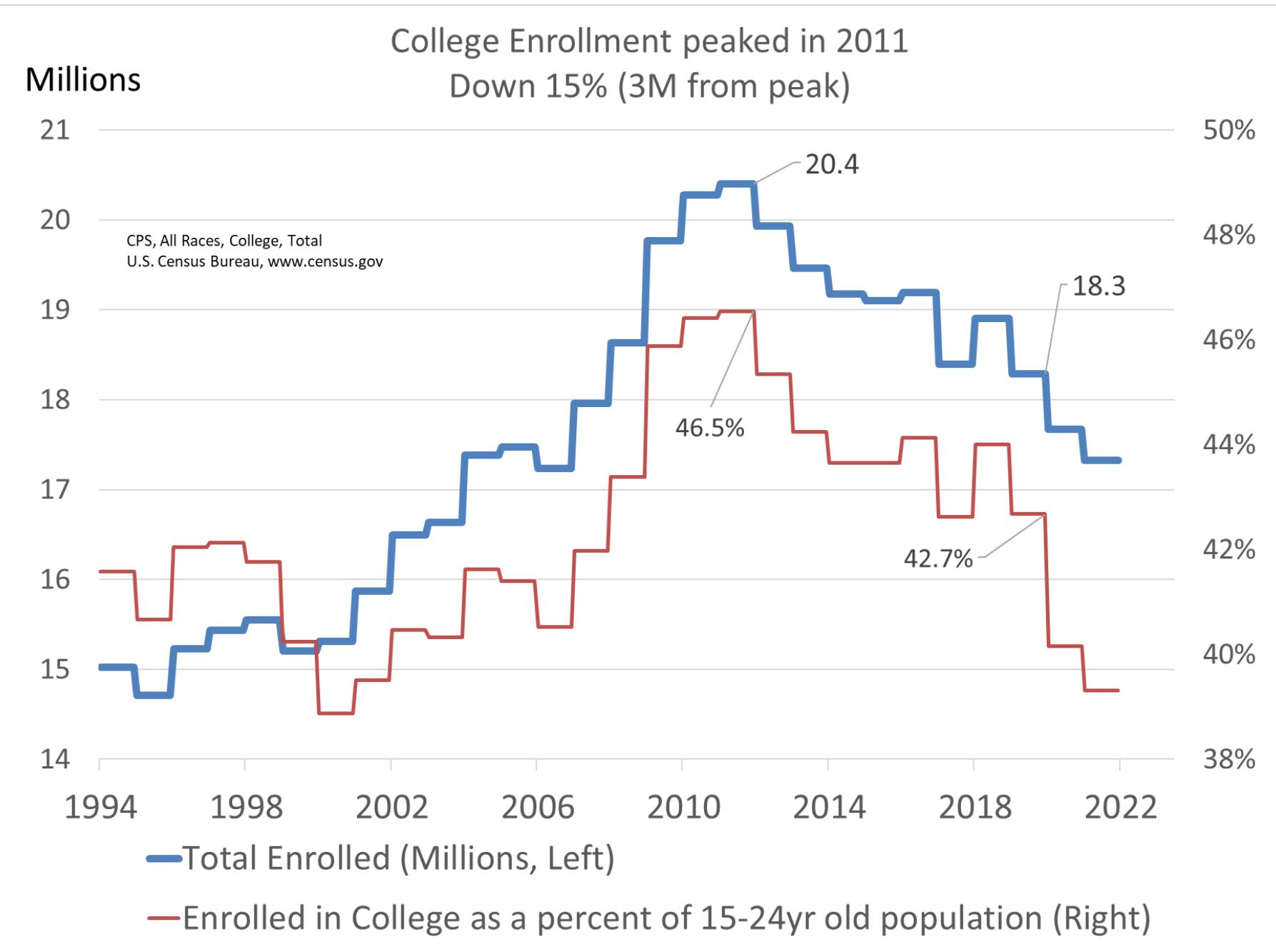
- How - does it matter
- Why –
- Solutions



Enrollment is falling and not because there are fewer people in that demographic

The “what”

Enrollment in both absolute terms and as a percent of the population peaked in 2011.



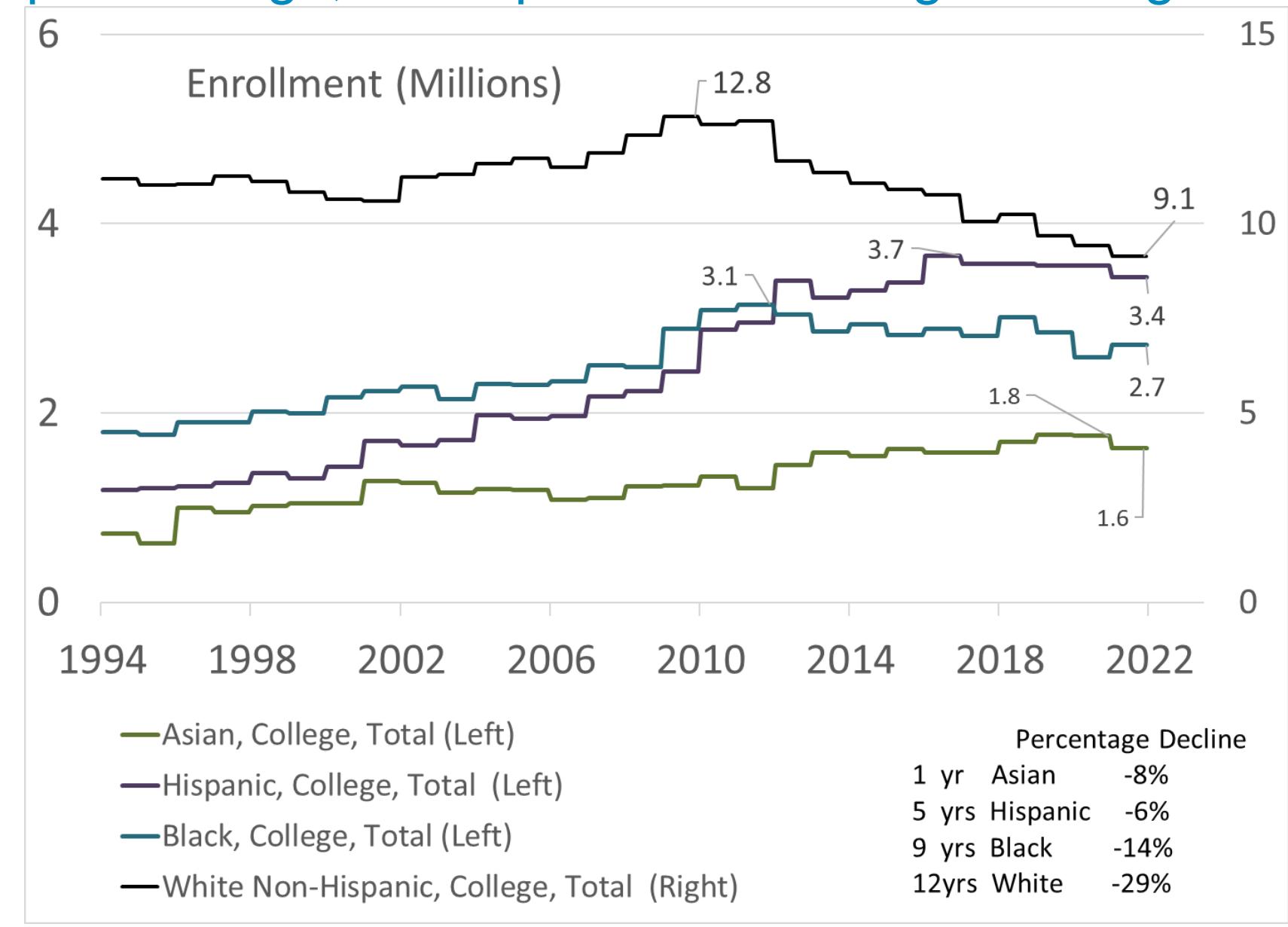
# Republicans giving up on college, will impact future college funding

White enrollment peaked 12 years ago  
Now **down 29%**

Black enrollment peaked 9 years ago

Hispanic enrollment peaked 5 years ago

A “Why” comment (slide 41)  
College is now a partisan issue. White enrollment is down 30% and men down more than women. White men voted 2:1 GOP from 2012-2020. That ratio 1.35 to 1.0 in 1996

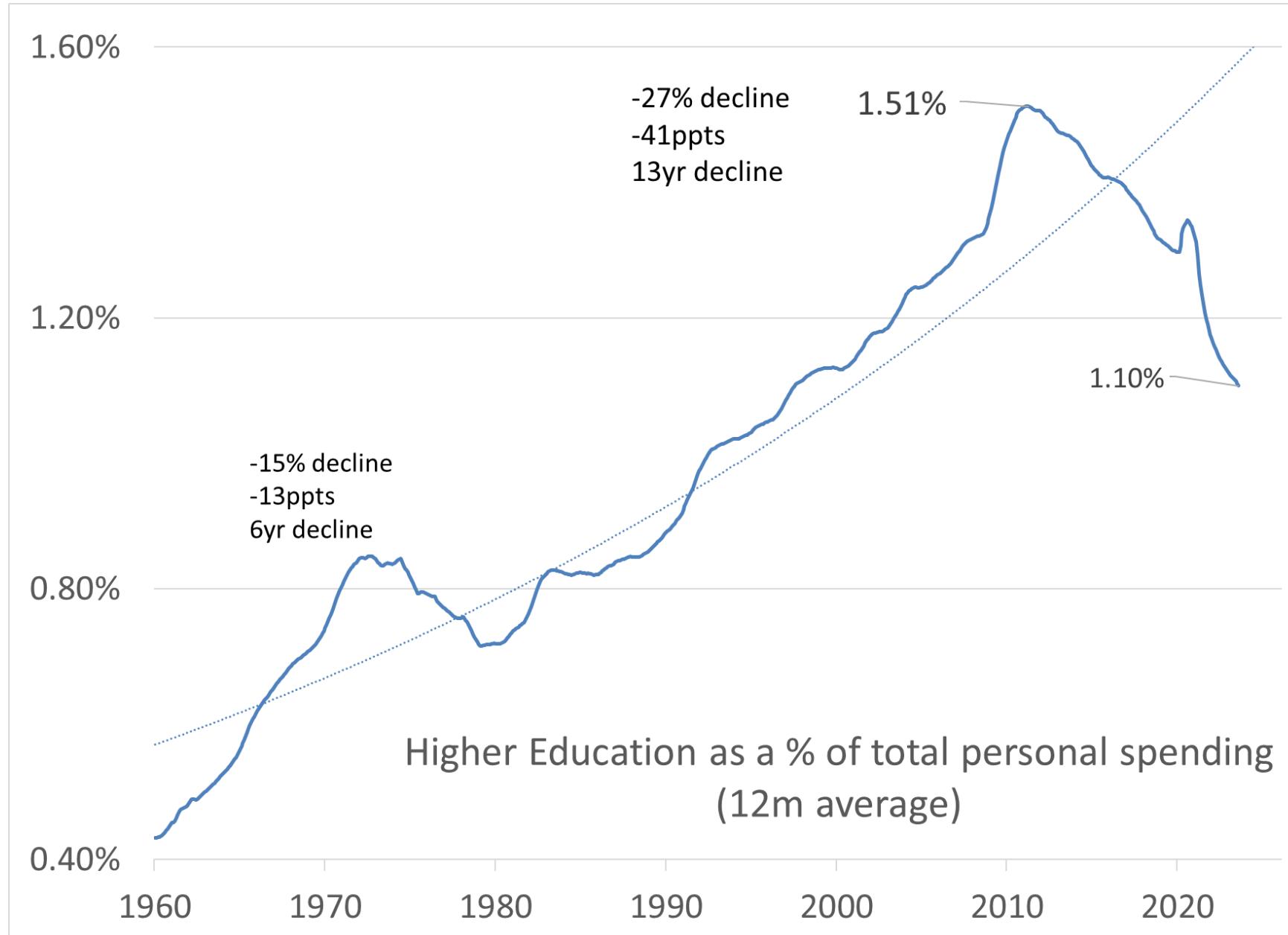


# Spending

Rose for 55-yrs  
2011 peak

Purse tightening  
Down 13-yrs  
and falling  
July 1.09%  
August 1.08%

US deprioritizing  
spending on  
college. “Why”  
investment isn’t  
worth it



# Overseas talent recruitment is ending

On a net migration basis (incoming vs. outgoing) Scientists traditionally flowed into the US, on net exited China, and on net exited the OECD.

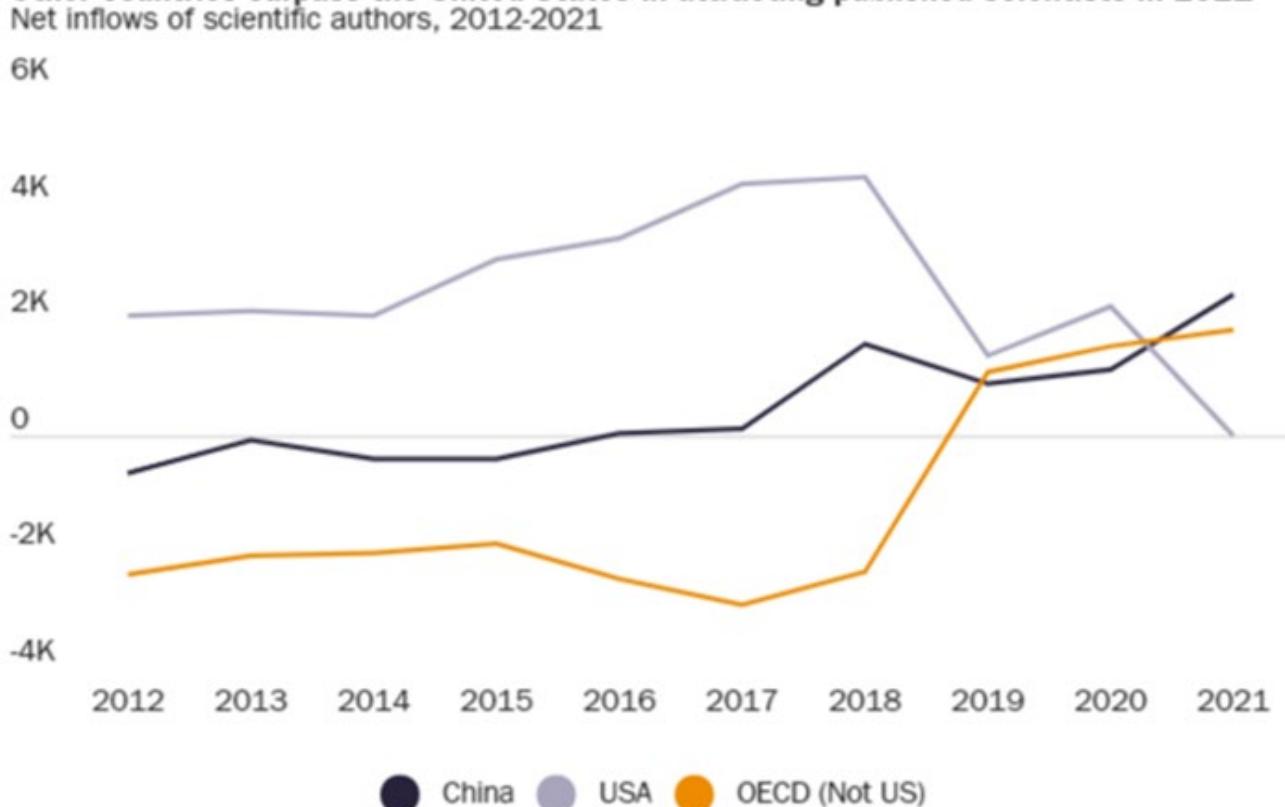
The peak US recruitment year was 2017. The US welcomed 4,292 published research scientists. (net migration basis) China welcomed 116; & non-US OECD nations lost 2,927.

By 2021, the US saw 4 scientists leave (again, on net); the non-US OECD welcomed 1,792; and China welcomed 2,408. This is “brain-drain” and a self-inflicted disaster.

Thanks to immigrants, the US won 75% of Nobel prizes in 2023. Without them, we only would have won 25%.

Figure 1

**Other countries surpass the United States in attracting published scientists in 2021**



Download data

Sources: OECD (2017), *OECD Science, Technology and Industry Scoreboard 2017: The digital transformation*, OECD Publishing, Paris, <https://doi.org/10.1787/9789264268821-en>.



# Brain Drain

- What - Fewer students
- How - does it matter

The longstanding US international educational advantage is shrinking. As this gap closes US productivity slows, patent creation shrinks, and fewer new firms are launched. As productivity slows, living standards rise more slowly. In my opinion this gives rise to isolationism, protectionism and other societal ailments.

- Why
- Solutions

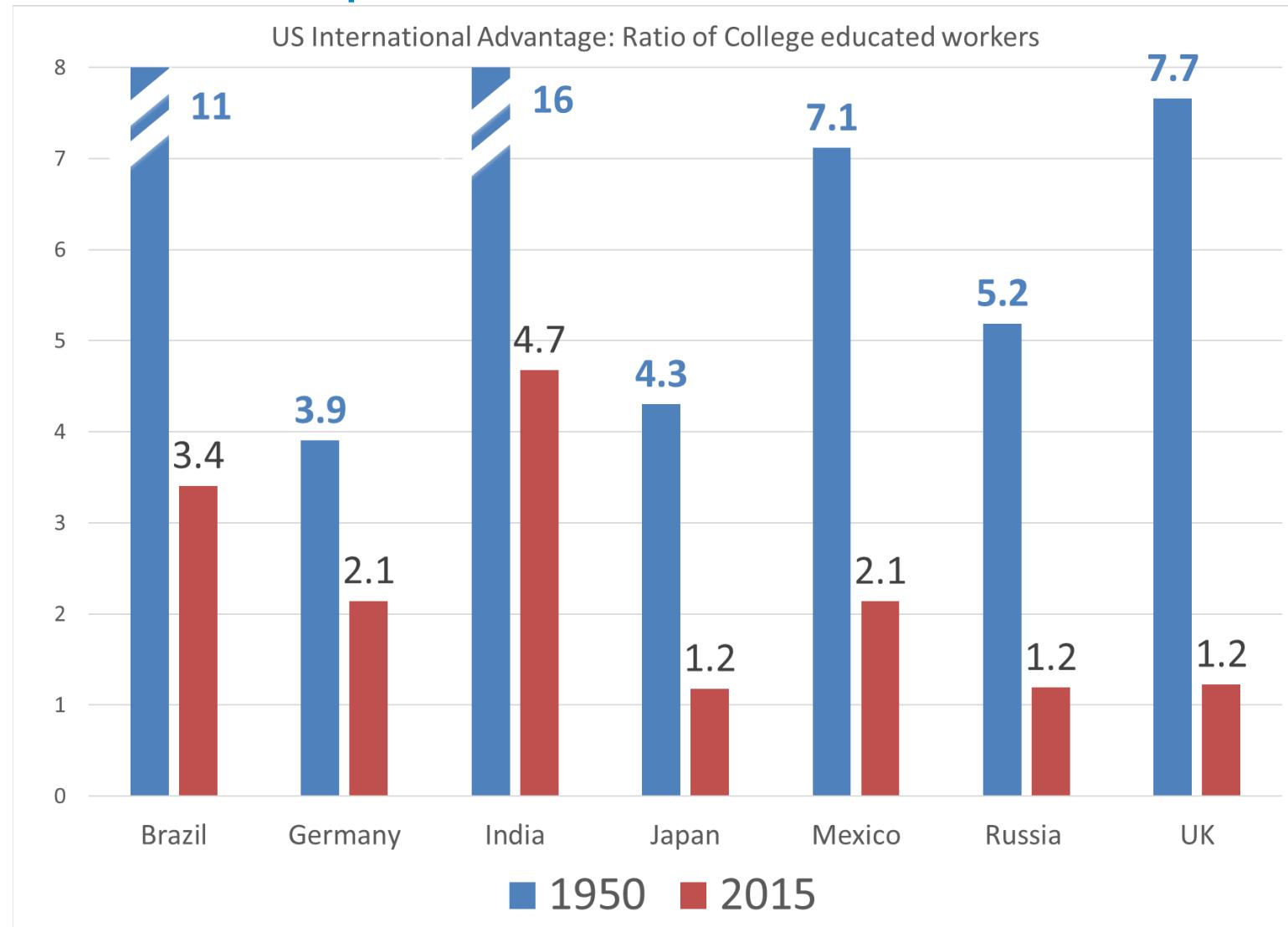


# College and Productivity: How is this a problem

US had 8x the percentage of college educated workers as these nations. 16x as many as India and 4x as many as Germany.

By 2015 the ratio shrank to 2:1. About 5x as many as India and nearly the same percent as Japan, Russia and the UK  
Japan 4x to 1:1

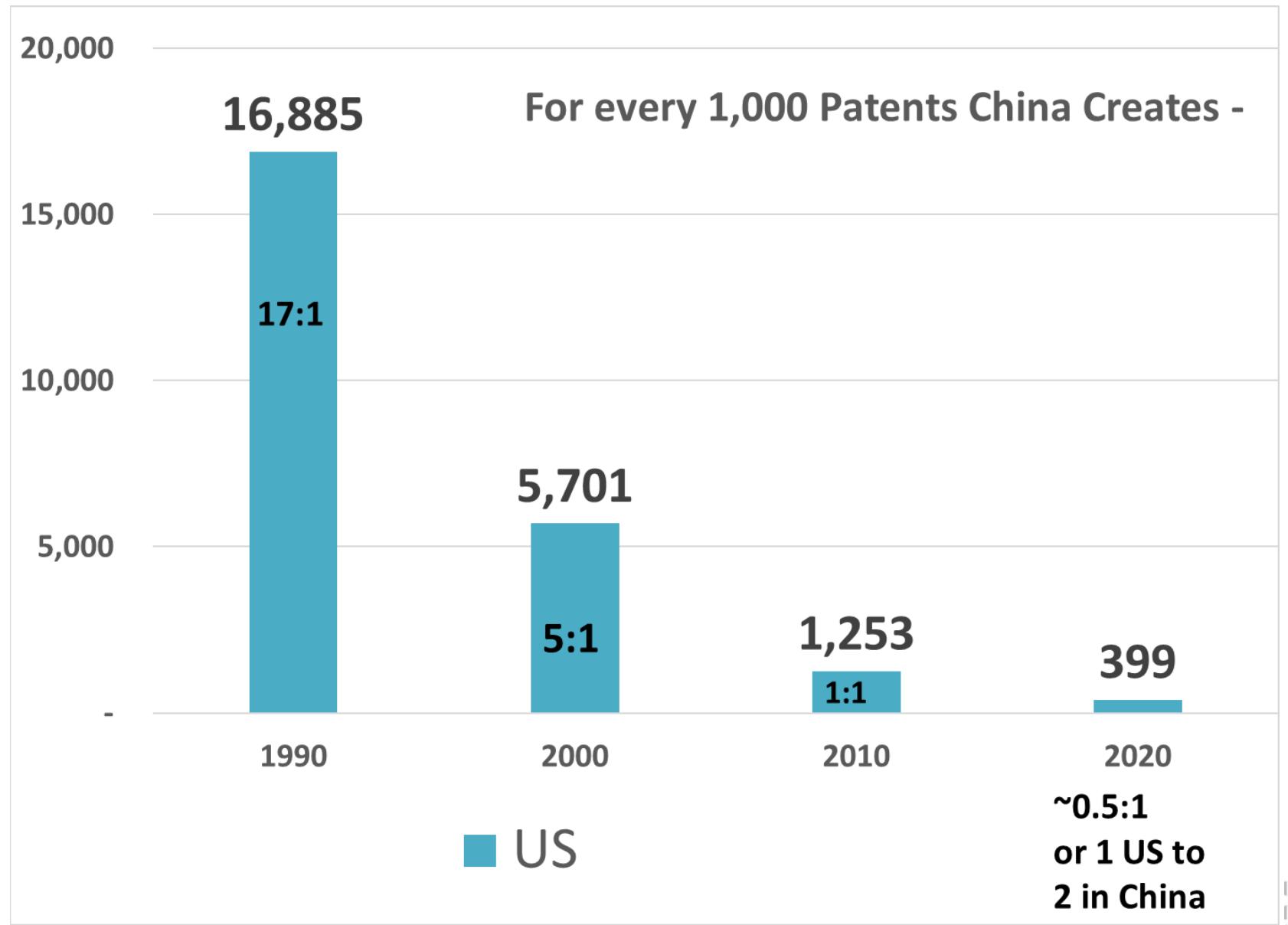
	1950	2015
Japan	2.0%	29%
US	8.0%	34%



# The edge in Patents

The US patent advantage disappeared by 2010.

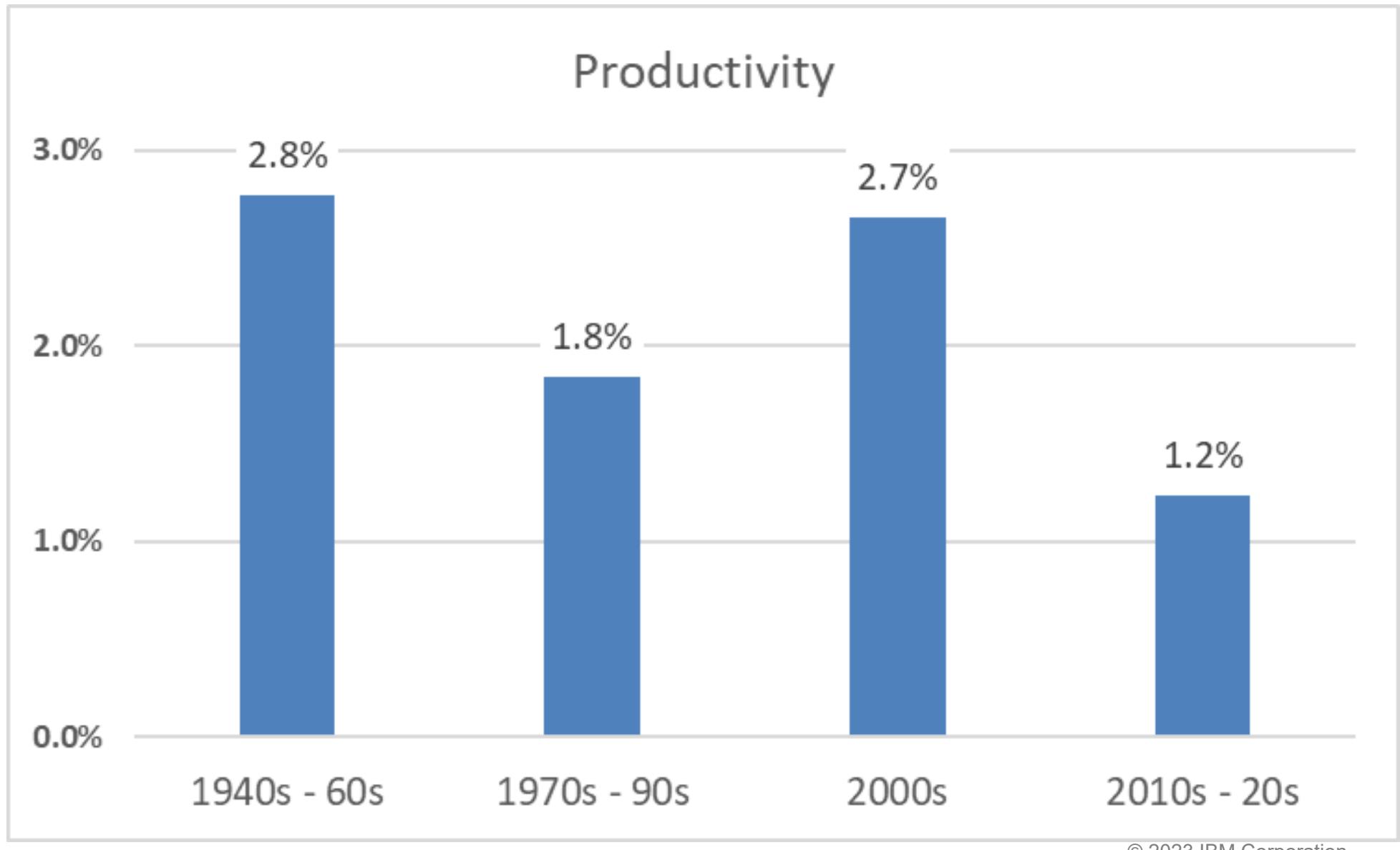
Last few years has been a disadvantage



## “How” it matters – a decline in new ideas

A 13-year  
slump in labor  
productivity

Labor Productivity,  
Nonfarm Business  
Sector

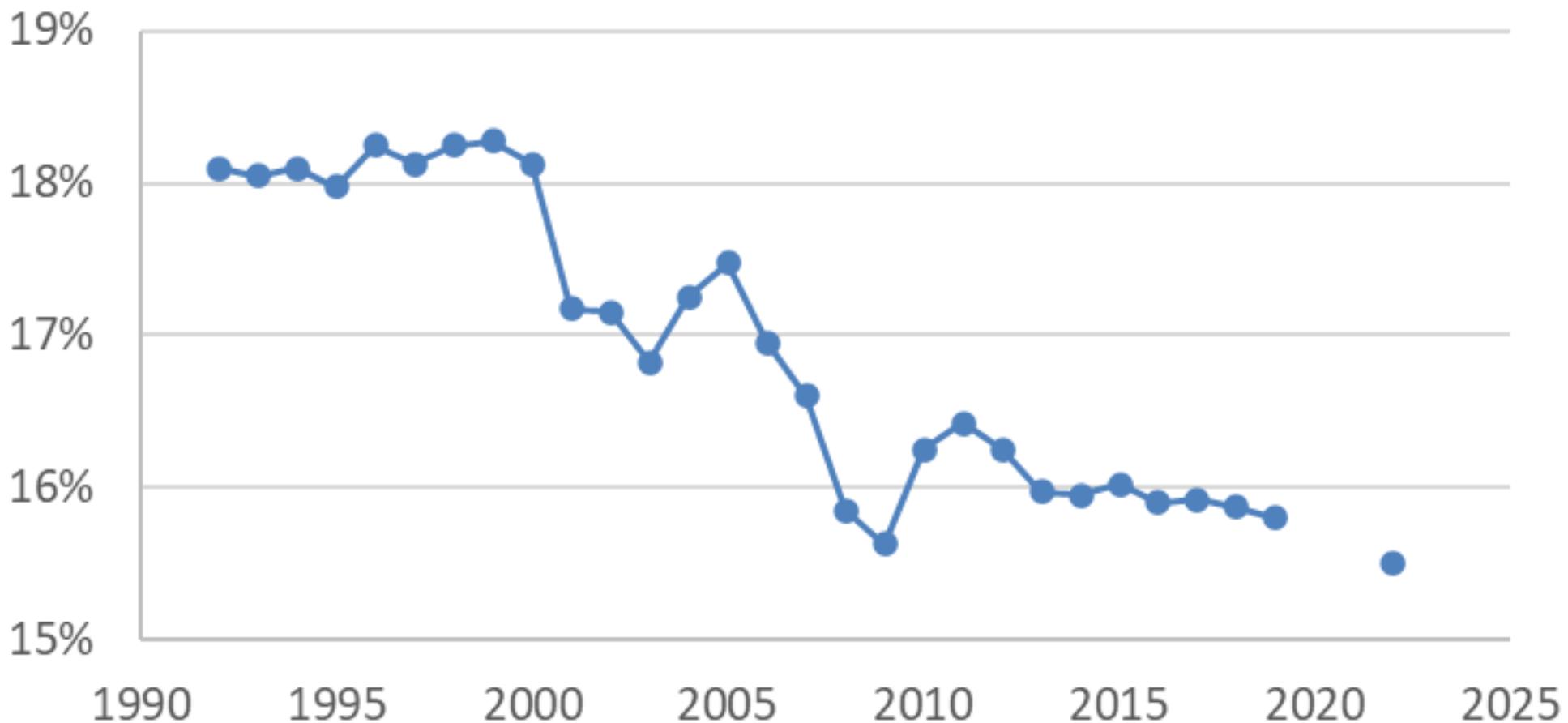


# US Entrepreneurial Spirit on the decline

Fewer  
new firms

Less risk  
taking

Percent of gross job gains for firms with 1 to 4  
employees



# Brain Drain

- What - Fewer students
- How - does it matter
- Why – **Controversial** and in some ways less important (14 “why” slides in appendix)
- When we had rapid productivity and growth the consensus outlook was a “win-win” openness and welcoming attitudes.
- Stagnant growth ushered in a fixed economic pie mentality which leads to zero-sum conflict. We most directly see this in two areas: College education has morphed into a partisan issue and the US outlook on immigration has withered. Issuing 1 Green card would have given the US 5G tech, instead he went to China.
- The Why includes rising college costs and reduced government investment, but also a diminishing return on investment (ROI) from education. Inequality and high mortality rates among young Americans further erode the value of higher education.
- Solutions



# Brain Drain

- What - Fewer students
- How - does it matter
- Why – see appendix
- Solutions
- The US needs higher productivity and growth to return to a “rising tide lifts all boats” mentality and its attendant positive externalities.
- AI to boost productivity and living standards and increasing government support is crucial. We will need to rely on AI to replace the missing skills to bolster R&D and lift domestic wages which creates an openness to immigration and ensures widespread economic growth.



# AI as research assistant

ChatGPT 3.5 and other AI models exceeding 100B parameters saw a step function in usability

Every person on this call should try  
<https://chat.openai.com/>  
the fastest technology to 100M users

**Help me study**  
vocabulary for a college entrance exam

**Show me a code snippet**  
of a website's sticky header

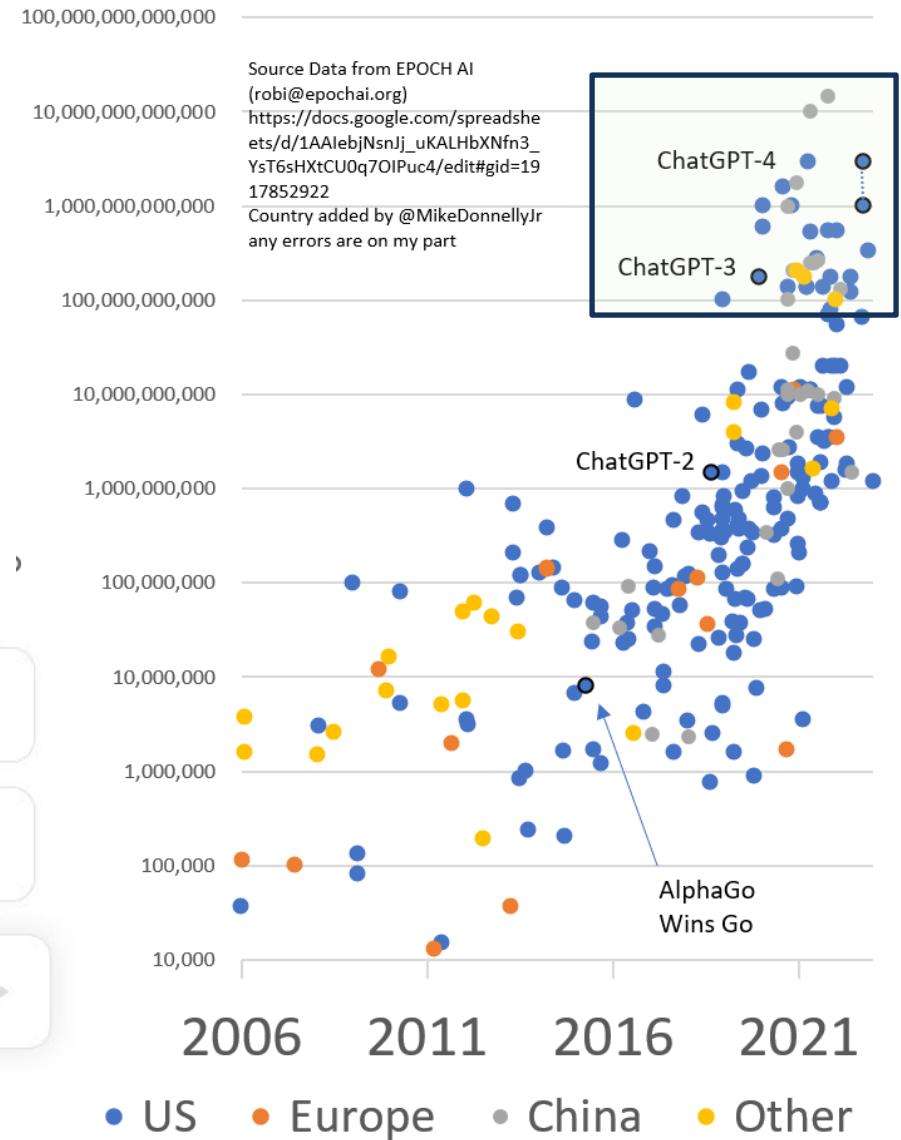
Send a message

**Make up a story**  
about Sharky, a tooth-brushing shark superhero

**Plan an itinerary**  
for a fashion-focused exploration of Paris

Free Research Preview. ChatGPT may produce inaccurate information about people, places, or facts. [ChatGPT August 3 Version](#)

AI model Parameters



# AI for all: The 160,000 Watson X challenge

Unsure how AI can  
help you or your  
employees?  
Cut and paste  
internal resume and  
ask ChatGPT what  
it can do

I've used it for HR  
functions and as a  
research assistant

Default (GPT-3.5)

 I have an employee who is uncertain as to how to use AI in her daily work, can you offer some examples for people in her job and her industry. Here is what I know about her.

IBM Sr Professional Treasury, Senior Global Risk Manager  
Senior Global Risk ManagerSenior Global Risk Manager  
IBM CorpIBM CorpJun 2005 - Present · 18 yrs 3 mos  
Risk Management  
Enterprise Risk ManagementEnterprise Risk Management  
Business Continuity  
Financial Risk  
8 endorsements8 endorsements  
Governance  
Insurance  
Financial Analysis  
Business Process Improvement  
Trusted business adviser in insurance with global experience  
Job role and specialties:  
Risk Management Professional  
This role has the responsibility for identifying and assuring the management of risks that directly impact the achievement of strategic objectives of IBM.  
Risk & Insurance Management  
Corporate Development Professional, M&A



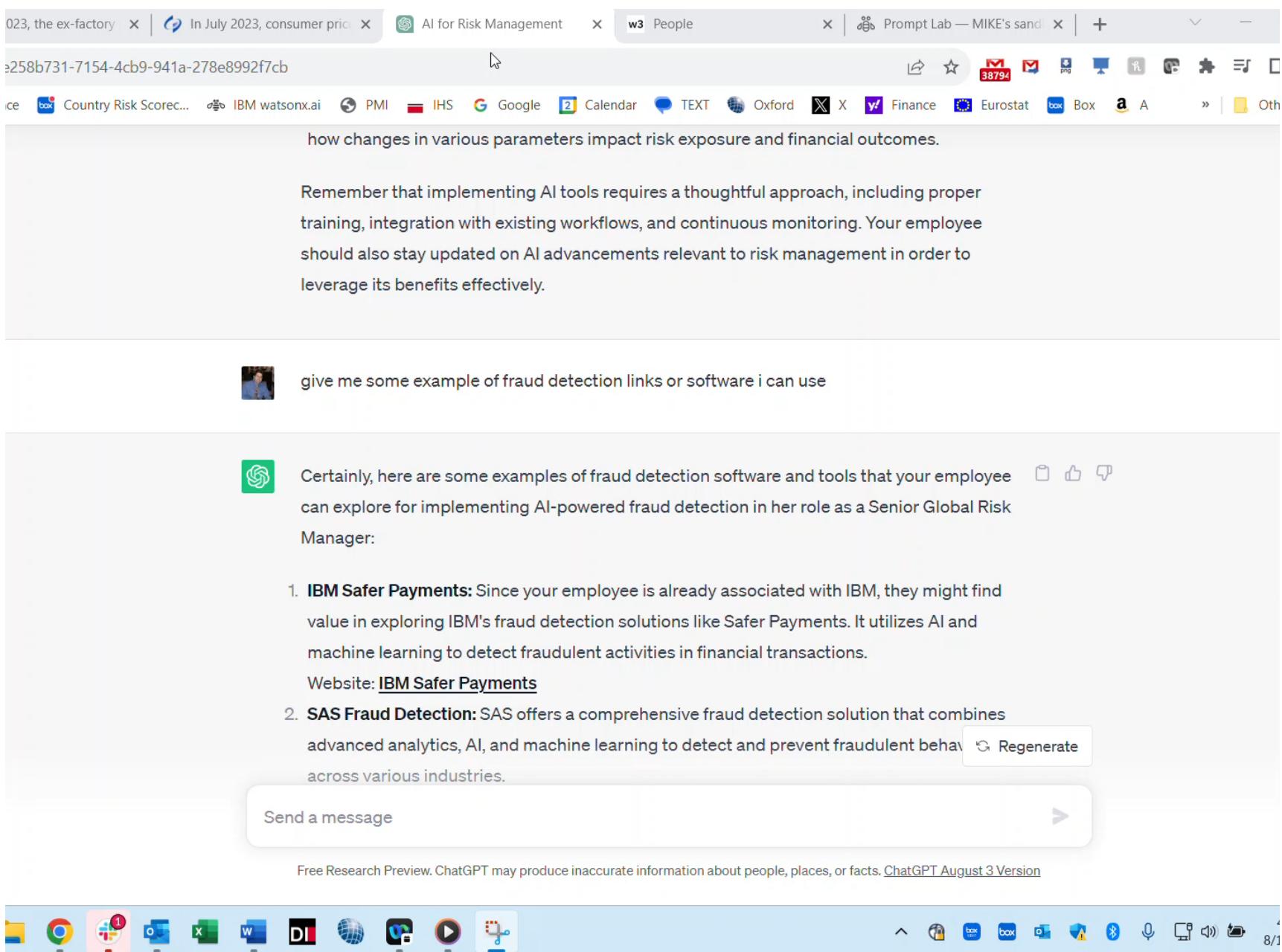
Send a message 

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# WatsonX on the job

Cut and paste Chinese NBS press release and summarize in WatsonX



023, the ex-factory | In July 2023, consumer price | AI for Risk Management | w3 People | Prompt Lab — MIKE's sand | + | -

e258b731-7154-4cb9-941a-278e8992f7cb

ce Country Risk Scorec... IBM watsonx.ai PMI IHS Google Calendar TEXT Oxford X Finance Eurostat Box A Oth

how changes in various parameters impact risk exposure and financial outcomes.

Remember that implementing AI tools requires a thoughtful approach, including proper training, integration with existing workflows, and continuous monitoring. Your employee should also stay updated on AI advancements relevant to risk management in order to leverage its benefits effectively.

give me some example of fraud detection links or software i can use

Certainly, here are some examples of fraud detection software and tools that your employee can explore for implementing AI-powered fraud detection in her role as a Senior Global Risk Manager:

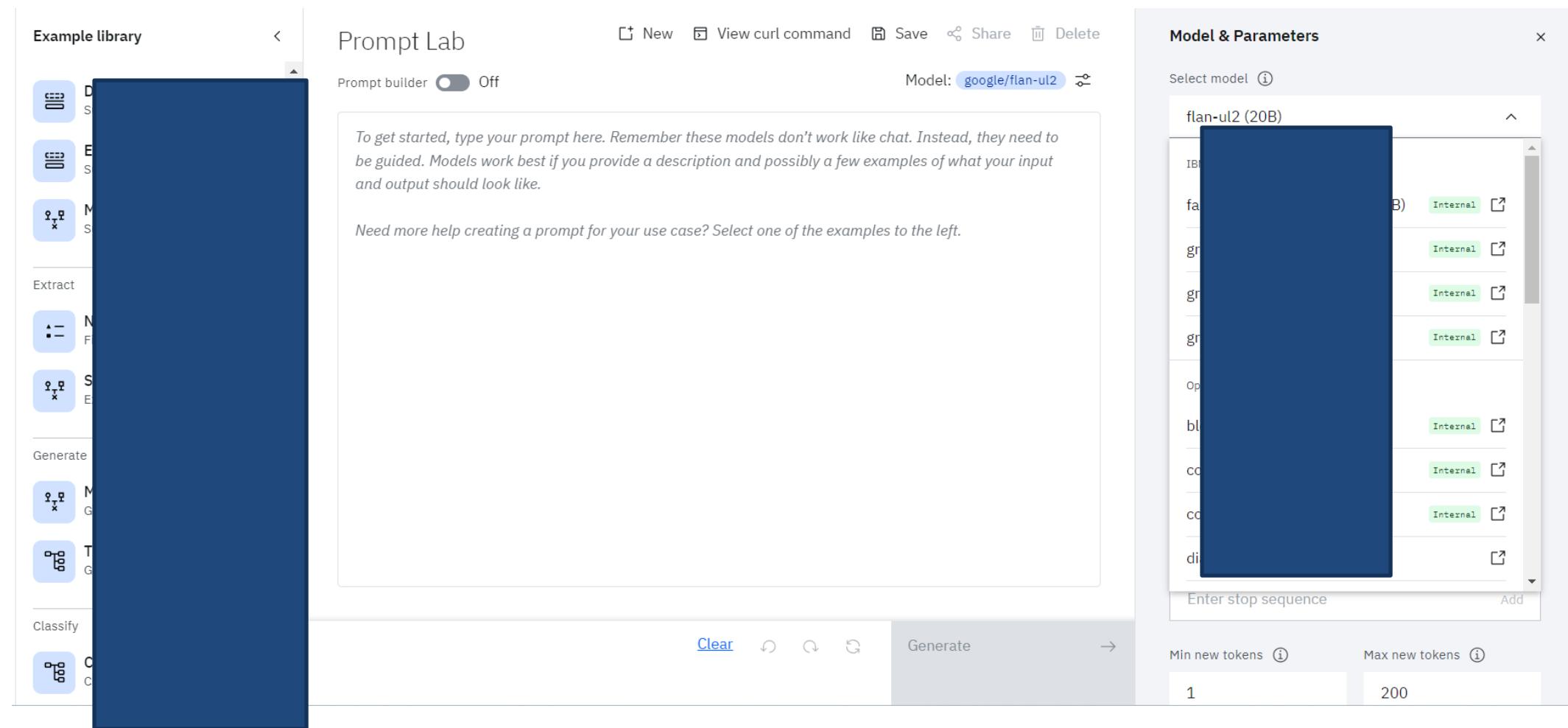
1. **IBM Safer Payments:** Since your employee is already associated with IBM, they might find value in exploring IBM's fraud detection solutions like Safer Payments. It utilizes AI and machine learning to detect fraudulent activities in financial transactions.  
Website: [IBM Safer Payments](#)
2. **SAS Fraud Detection:** SAS offers a comprehensive fraud detection solution that combines advanced analytics, AI, and machine learning to detect and prevent fraudulent behavior across various industries.

Send a message

Free Research Preview. ChatGPT may produce inaccurate information about people, places, or facts. [ChatGPT August 3 Version](#)

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# More WatsonX



The image shows two overlapping interface windows from the WatsonX platform. The left window is titled 'Prompt Lab' and features a sidebar with icons for 'Example library', 'Extract', 'Generate', and 'Classify'. The main area contains a text input field with placeholder text: 'To get started, type your prompt here. Remember these models don't work like chat. Instead, they need to be guided. Models work best if you provide a description and possibly a few examples of what your input and output should look like.' Below this is another placeholder: 'Need more help creating a prompt for your use case? Select one of the examples to the left.' The right window is titled 'Model & Parameters' and shows a list of model components for 'flan-ul2 (20B)'. It includes sections for 'IB', 'fa', 'gr', 'gr', 'gr', 'Op', 'bl', 'co', 'co', and 'di'. Each component has an 'Internal' button next to it. At the bottom, there are fields for 'Enter stop sequence', 'Min new tokens' (set to 1), and 'Max new tokens' (set to 200).

Filling out forms and surveys and RFPs was a recent AI challenge winning project

# Reinventing HR Support

IBM leveraged the power of **IBM AI and Automation** to deliver a new, simplified, personalized and data driven employee experience.

Automated self-service capabilities including FAQ's, Policy search, automated tasks, data-driven nudges and intelligent assignment to human tier 1

**Speed to Value and productivity for employees, managers, executives, assignees, candidates and alumni** with proven process configurations and pre-built accelerators:



EMPLOYEE



**Support Search**

Find self-serve content using **Watson Discovery, Watson NLU**



**Virtual Agent**

24/7 support, using **Watson Assistant, NLU & Watson Discovery**



**Intelligent Routing**

Reduction in wait time, using **IBM Cloud Pak for Data**



EMPLOYEE SERVICES



**AI Data Ingestion**

Less data entry, Language Translation using **Watson Language Translator**



**HR Nudges**

Automatic pro-active employee & manager nudges using **Watson Assistant & Slack**



**Integrated Automations**

for end user tasks to over 10 open HR platforms e.g. Workday, SAP using **Watson Assistant & IBM RPA**

Human Tasks  
Automated Tasks  
AI Augmented Tasks



96%  
Manager adoption



94%  
cases solved by  
virtual assistant

9M  
employee  
interactions  
(up 66% YTY)

22%  
human assisted  
ticket reduction

837k  
automated  
transactions



56%  
ROI  
YTY increase in  
Productivity  
Savings

# Modernizing Lead to Cash

Intelligent Workflow with real time insights, automation, and AI-based applications driving simplification

Core strategic platforms (Salesforce, SAP) augmented with IBM AI and Cloud Paks

Drive **speed**, deliver with **impeccable execution** and increase **productivity** from business-led, technology-enabled **digital transformation**



SELLER



**Cognitive Pricing**  
Optimal Price recommendation



**Contract AI**  
Identify contract risky language



**Blue Bots**  
AI driven seller support



QUOTE-TO-CASH SPECIALIST



**Touchless execution**  
End-to-end automation with configuration for exception handling\*



**Automated Billing**  
Automated billing release ensuring customer receives right bill at right time



**Real time insight**  
End to end integrated data with actionable analytics on the fly\*

50%  
Reduction in time to quote with SAP CPQ\*



252K  
Seller hours saved with pricing analytics



Manual Tasks  
Automated Tasks  
AI Augmented Tasks

50%  
Contract Registration cycle time reduction (days to hours)

97%  
Billing and Invoicing cycle time reduction (days to minutes)



\* Deployment in progress as part of IBM transformation with SAP

# A Transformational Journey to Digital Enterprise

## IMPACT

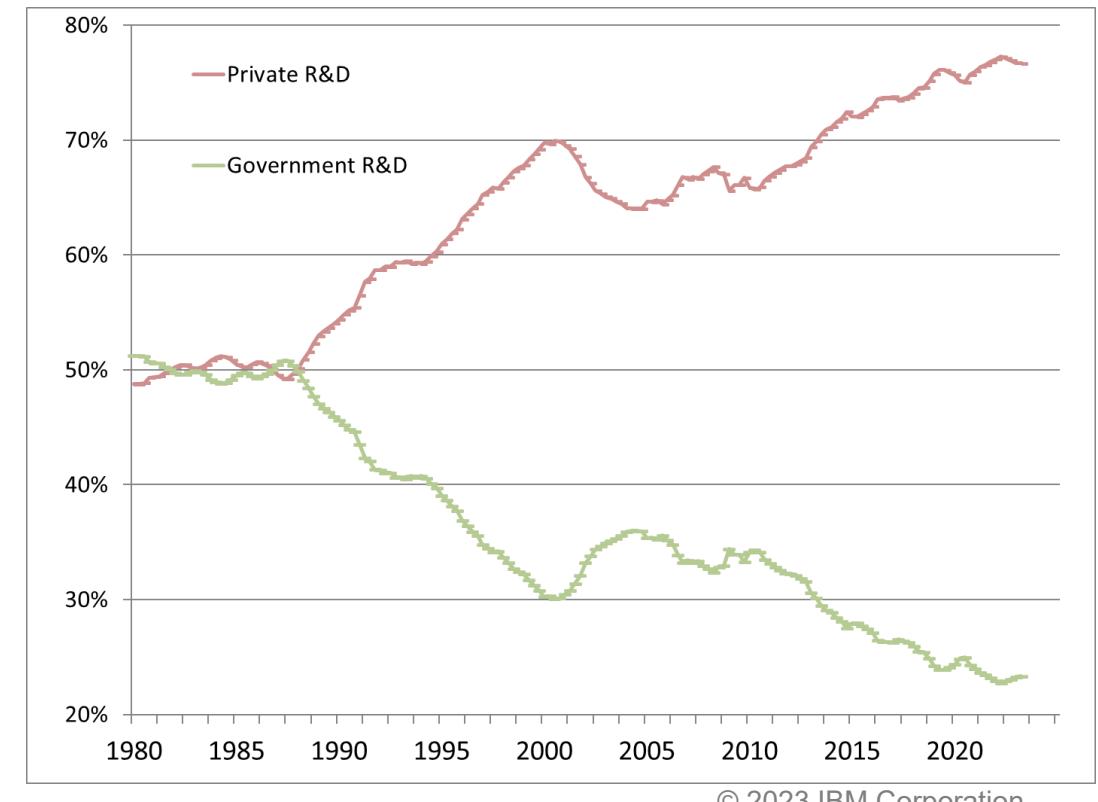
1999	2000	2015	2016	2020	2021+
<p>Discrete Shared Services</p> <ul style="list-style-type: none"> <li>• Consolidate transaction processing</li> <li>• Discrete business unit service centers</li> </ul> <p>Common chart of accounts</p> <p>Standardized processes</p> <p>Centralized leadership and reporting structure</p> <p>Creation of centers of excellence</p>	<p>Globally Integrated Enterprise</p> <ul style="list-style-type: none"> <li>• Scale efficiencies</li> <li>• Vertical process standardization</li> <li>• Alternative labor models</li> <li>• Connected delivery model</li> </ul> <p><b>\$8B+</b> cost reduction</p> <p><b>50%</b> spend reduction over 10 years</p> <p><b>Global</b> talent pools</p> <p><b>11</b> shared services towers</p> <p>Process standardization</p>	<p>Cognitive Enterprise</p> <ul style="list-style-type: none"> <li>• Digitized, cloud-based technology</li> <li>• Workflow optimization, Agile</li> <li>• Horizontal process standardization</li> <li>• Service excellence culture, NPS</li> <li>• IBM Data Lake and NextGen applications</li> <li>• Innovation data/analytics and AI</li> <li>• Robotic process automation (RPA)</li> <li>• Personalized Learning</li> </ul>	<p><b>\$4B+</b> business benefits across the portfolio</p> <p><b>40%</b> productivity gains</p> <p><b>1M+</b> hours of manual work automated</p> <p><b>40%</b> cycle time improvements</p> <p>Increase <b>+8</b> NPS score</p> <p><b>20</b> points rise in IBM engagement scores</p> <p><b>\$1.5B</b> business value from AI projects</p>	<p>Pervasive enterprise digitization</p> <p>Data curated to support AI</p> <p>Intelligent workflows</p> <p>Hybrid Cloud</p> <p>Platform delivery</p> <p>Agility across organizational boundaries</p> <p>Workforce and skills analytics linked to financial objectives</p>	<p><b>95%</b> Touchless transactional processing</p> <p><b>80%</b> AI infused workflows</p> <p><b>\$1B+</b> business value driven by AI</p> <p>Increase <b>+5</b> NPS score</p> <p><b>10</b> points rise in IBM engagement scores</p> <p><b>Double Digit</b> productivity gains</p>
					

# Solutions

## Short term – Productivity must rise

Government investment: At the end of the cold war the government stepped back from investing in research. In 1987, 51% of all R&D was done by the government. Supporting basic research spun off inventions and innovations that were not profitable for decades, a function the private sector is ill equipped to serve. Today the Government provides only 23% of all R&D. The share of software investment is similar. In 1992 the government accounted for 27% of all spending on software, this has dropped to 12%.

We need more workers (immigration) but for reasons outlined in the appendix that solution is off the table. We must embrace AI to enhance the output of the workers we have. We must ramp productivity to expand prosperity.



## Solutions

Medium term solutions – Reaffirm the American values of Freedom of Religion and an openness to immigration. However, sharing the American “pie” of economic growth must be shared by all to create a nation receptive to welcoming others.

Argentina is a textbook example of negative feedback loop. The percentage of college educated workers fell in half from 1990 to 2015.



# Solutions

Long term solutions – A return to 1940-1980 America.

- 1) Remove the corrupting influence of money in politics “pay for play” and shrinks the remaining political fights to fringe culture war topics.
  - Corruption is negatively linked to the level of investment and economic growth, the more corruption, the less investment and the less economic growth. ([IMF](#))
  - Corrupt politicians choose investment projects not on the basis of their intrinsic economic worth, but on the opportunity for bribes these projects present. ([IMF](#))
  - Economic theory suggests that high levels of corruption are associated with lower quality goods and services the government provides ([Various](#))
  - Money gives big spenders [leverage to reshape the economy](#). The policies they want — low tax rates & underinvestment in the future



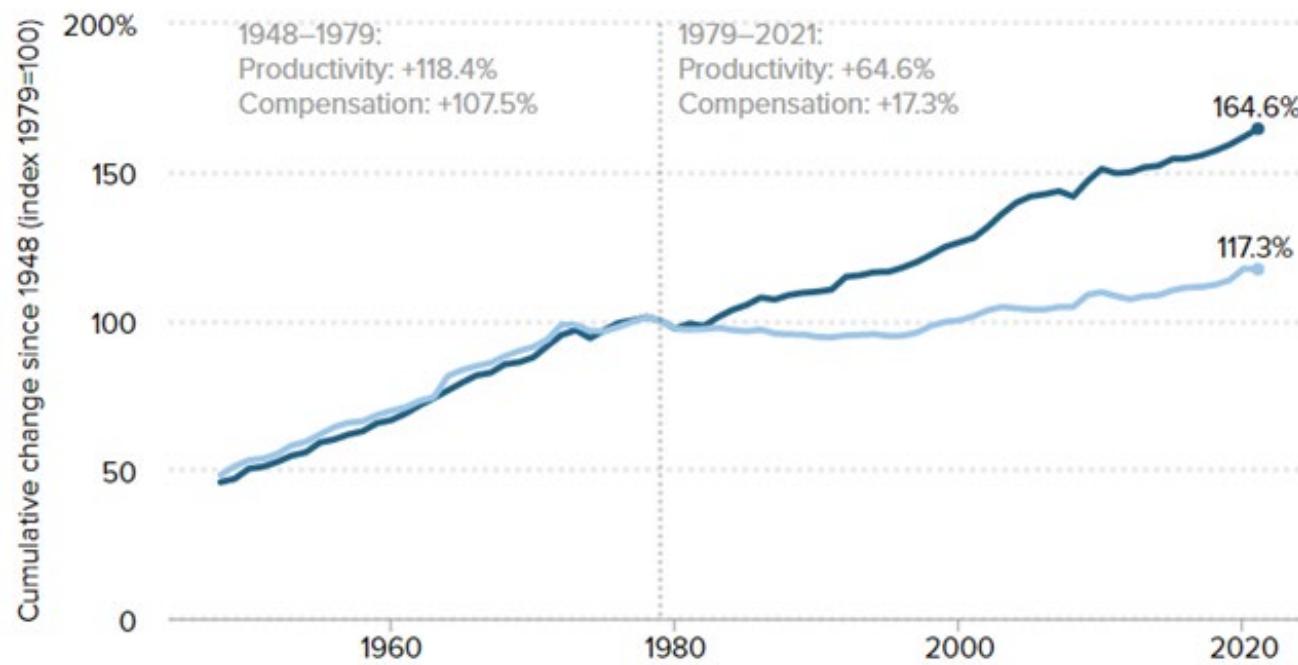
# Solutions

Long term solutions – A return to 1940-1980 America.

- 2) Return to wages linked to productivity. Pay for output.  
Our brains are hard wired for “fairness”

**The gap between productivity and a typical worker's compensation has increased dramatically since 1979**

Productivity growth and hourly compensation growth, 1948–2021



**Capuchins  
reject  
unequal  
pay**

w/ Dr. Sarah Brosnan



[TED talk](#)



## Take-aways:

- 1. Invest in Education and Skill Development:** Businesses should recognize **the importance of nurturing a skilled workforce**, and this responsibility falls more heavily upon their shoulders. Proactivity engage with educational institutions, offer internships, apprenticeships, and upskilling programs. IBM mandates 40 hours of education every year, and offers incentives for 80 hours. This investment not only ensures access to the right talent but also fosters innovation and adaptability within the organization.
- 2. Leveraging AI for Productivity:** AI holds the potential to enhance productivity, businesses need to approach its integration ethically. Demand fairness and accountability in AI algorithms to avoid biases and discrimination. **Acknowledge the need for reskilling and lifelong learning initiatives.** By supporting employees in acquiring new skills, businesses can navigate the changing landscape and ensure that AI-driven advances benefit both the company and its workforce.
- 3. Global Talent Acquisition Drive:** The shrinking US international educational advantage underscores the need for **global collaboration**. Businesses should actively **seek talent beyond borders**, engaging in international partnerships and collaborations to fuel innovation. By leveraging the expertise of a global workforce, companies can drive creativity, expand market reach, and position themselves for sustained growth in a competitive landscape.

