The DENNY CENTER for Democratic Capitalism
GEORGETOWN LAW

Taking a Closer Look at Industrial Policy

ANNUAL REPORT ON THE HEALTH OF DEMOCRATIC CAPITALISM 2024

The Denny Center for Democratic Capitalism at Georgetown Law exists to reconcile the benefits of free market capitalism with the values and expectations of a democratic society.

THE DENNY CENTER AND ITS MISSION

Established in 2020 by a generous gift from Georgetown Law alumnus James M. Denny (L'60) and charged with a unique vision grounded in life experience, the Denny Center for Democratic Capitalism at Georgetown Law exists to reconcile the benefits of free market capitalism with the values and expectations of a democratic society. To carry out its mission, the Denny Center pursues work in three areas: (1) producing research, beginning with the center's signature Annual Report on the Health of Democratic Capitalism (the "Annual Report"), to analyze the current health of democratic capitalism (i.e., both its economic vitality and its broader contribution to the well-being of citizens, households, and society), (2) convening leading voices from business, government, and societal institutions to discuss the existing tensions and recommend potential paths forward, and (3) creating student experiences to enrich their education, engage them in the center's work, and prepare them for lifelong contributions.

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Executive Summary

CONTEXT

Our *Inaugural Report on the Health of Democratic Capitalism* in 2022 identified key datasets, or vital signs, that highlight potential threats to democratic societies which embrace free market economics as the engine of growth and innovation. The Inaugural Report validated headline concerns over income inequality (real and perceived), slower upward mobility in economic terms, lack of coordinated environmental stewardship, and declining public trust in institutions. At the same time, the report found that overall GDP growth was slowing, that investment in innovation was losing steam, and that government spending continued to increase.

We revisited our vital sign datasets in 2023 with similar findings, and we took a closer look at the quality of market competition—a critical ingredient in healthy market economies. Our *2023 Annual Report on the Health of Democratic Capitalism* confirmed that market competition is under pressure with datasets demonstrating an increase in overall industry concentration, a long-term downward trend in antitrust enforcement, and a decline in business investment and labor productivity. The report also raised questions about regulatory capture and increasing government regulation, spending, and code length and complexity, which lead to the theme of this year's report.

We shift the focus for our 2024 report from the private sector to the public sector, and after refreshing the core vital signs for the U.S. and select democratic market economies, ***we investigate government market interventions known as industrial policy.*** Though industrial policy has existed in various forms for a long time, global interventions of this type have increased exponentially in recent years. Industrial policy has also found new footing in recent U.S. administrations.

In October of 2022, Brian Deese, Director of President Biden's National Economic Council, declared that it was time for America to embrace a "modern industrial policy" as the Biden administration promoted three significant industrial policy-related actions: (1) the Bipartisan Infrastructure Law, (2) the CHIPs and Science Act, and (3) the Inflation Reduction Act.[1] Whether the 2021-2022 Biden industrial policy actions succeed or fail, their cost will be substantial with McKinsey estimating they will collectively result in $2 trillion in government spending over the next 10 years.[2]

IN REVIEW | ANNUAL REPORT ON THE HEALTH OF DEMOCRATIC CAPITALISM 2023

Our annual reports to-date have evaluated how well the benefits of free market capitalism are balanced with the needs and expectations of a democratic society. While free market capitalism is highly efficient at generating wealth, reconciling the benefits of capitalism with broader societal needs and aspirations is a perennial tug of war. The Denny Center was founded on the belief that maintaining balance between the two is critical to the future of both capitalism and a flourishing democratic society.

The annual reports begin by highlighting trends in core vital sign datasets that measure the health of the U.S. economy as well as that of a handful of international democratic societies.[3] The datasets are organized into five core questions:

[1] Deese, Brian, *Remarks on Executing a Modern Industrial Strategy,* City Club of Cleveland, October 13, 2022.
[2] Badlam, J., et al., "The Inflation Reduction Act: Here's What's In It," McKinsey Public Sector Practice (2022).
[3] Including Australia, France, Germany, Japan, and the United Kingdom.

1. **Efficacy & vitality:** *Does our economic system generate growing total wealth?*
2. **Fairness & social mobility:** *Does the system address the well-being of all members of society, or does it favor distinct groups?*
3. **Social well-being & stability:** *How does the system strengthen (or weaken) society more broadly?*
4. **Business environment:** *What is the current status and nature of free market competition, and how well is the business community positioned to address current pressures on the system?*
5. **International comparisons:** *How does the U.S. compare to other democratic economies, and what can we learn from the differences?*

After reconsidering updated vital signs and taking a deeper dive into the quality of market competition in 2023's report, we discovered the following threats and risks that led us to our 2024 focus area:

- **Overall industry concentration has increased** over historical norms, and in most of the industry sectors we studied, overall profits are up, and the **market share of the largest competitors has grown.**
- **Lower GDP growth continues and could be driven in part by the consequences of less robust market competition** including lower investment, less innovation, and the reduced variety of consumer choices in certain sectors.
- **Net investment has stayed constant or declined,** as companies continue to pay out more in dividends and share repurchases.
- Though government antitrust actions fluctuate with which political party is in power, there appears to be **a downward longer-term trend in antitrust enforcement.**
- **Government regulation, as measured by pages in the federal register, continues to rise** and lobbying spending shows no signs of slowing down.
- **Government agency accountability and performance are also in question,** leaving citizens with less confidence that policy makers will offer innovative responses to address shortcomings of the market economy.

It's in this context that we take a closer look at industrial policy: defining it, quantifying the growing pervasiveness of such interventions, weighing what evidence we could find on its effectiveness, and citing case examples of past policies.

LOOKING AHEAD | DENNY CENTER RESEARCH PROCESS AND 2024 REPORT FOCUS

The Denny Center takes a clinical approach to measuring the health of democratic capitalism, using objective datasets to assess how well the market economy is serving the well-being of our democratic society. To that end, our team identified and grouped vital statistics relevant to the health of democratic capitalism in the U.S., recorded U.S. trends for each vital statistic dataset, and compared a subset of these vital statistic results to those of a handful of other developed countries. In this 2024 report, we have grouped the datasets into two sections: **(1) revisiting key datasets from our earlier reports in 2022 and 2023,** and **(2) taking a deep dive into the definition, growing volume, and effectiveness of industrial policy interventions** with the addition of new datasets as applicable. This year's report also includes responsive essays from economists Betsey Stevenson (University of Michigan) and Michael Strain (American Enterprise Institute), as well as an addendum essay on government debt levels and future implications.

2024 FINDINGS AND QUESTIONS

1. Key Datasets 2024

Perhaps not surprisingly, given the macro nature of the areas studied, few if any of the key dataset trends show material differences in our 2024 update. Below we summarize our key observations from this year's vital signs:

- **The GDP growth rate remains under pressure,** driven by slowing productivity improvements and lower fertility rates. Less robust market competition is also a likely contributor to the problem.
- **Labor share of GDP remains low, and income gaps continue to widen**—though new analysis suggests that the income for the lower quintiles of earners might have grown faster than previously believed.
- **The ratio of CEO compensation to that of the average worker still exceeds 250 times,** and there's little evidence that CEOs or their boards are proactively exploring new approaches to executive pay.
- **Government regulation of business continues to grow** though this year's Supreme Court reversal of the Chevron deference, in place since 1984, may change the future trajectory.
- **Expenditures in response to billion-dollar disasters** remain at historically high levels, and collective approaches to environmental stewardship are fragmented at best.
- **Trust in institutions has remained at historic lows** with trust in business only slightly better than that in government. Other surveys indicate Americans' highest trust levels are reserved for small business and the military.
- International comparison datasets suggest that **the U.S. has not gained much ground relative to other democratic economies.**

2. Deep Dive: Taking a Closer Look at Industrial Policy

Overall, the datasets we analyzed confirm the growth of industrial policy actions, both in the U.S. and globally, and highlight the difficulty in measuring industrial policy performance over time. In addition, the growing number of government-led interventions in the market economy do not appear to positively impact society's confidence in the government's ability to solve problems or trust in institutions more broadly.

Our initial findings from the deep dive on industrial policy include:

- **Overall government spending has increased significantly as a percent of GDP,** leading more voices to call for future fiscal restraint and question how long current deficits—and resulting total government debt—are sustainable.
- **Industrial policy interventions increased significantly** since 2010, with most policies enacted in the developed and highest income-ranked countries.
- With more than 16,000 press mentions in a recent annual count, **the media has also ramped up its coverage of industrial policy actions,** reflecting both the rising use of industrial policies and renewed interest in such programs.
- **Bolstering national competitiveness led the list of industrial policy motivations** with protecting the climate running a close second. Building value chain resilience, addressing geopolitical concerns, and enhancing national security were other top motives.

- In the developed economies of Western Europe, North America, and Asia, **the leading industries targeted by industrial policy** included nuclear power plants (and supporting technologies), mineral mining and products, and electrical machinery and equipment (which includes semiconductor manufacturing).
- **Evaluating the effectiveness of industrial policy measures is complex,** and scholars have only recently produced reliable performance studies for a handful of specific policies.
- Experts agree that **the effectiveness of industrial policy interventions is a mixed bag.** Though we identified a few success stories, the jury is still out in most cases.
- **Most Americans don't have confidence in government to solve problems**—with (54%) saying government should do less, according to a recent Gallup poll.

KEY QUESTIONS FOR PATHS FORWARD

- As citizens, how can we encourage lawmakers to strengthen our national fiscal balance sheet now—knowing that benefits may not be realized until after the next few election cycles?
- What level and which kinds of industrial policy are appropriate in market economies to steward a healthy level of market competition? Should governments embrace a "less is more" approach, using fewer interventions with more limited scopes to improve the likelihood of success?
- What can leaders across our institutions do to support and improve impartial evaluation of industrial policy performance? How can front-end metrics be built-in and required for new industrial policy actions?
- How can business leaders and lawmakers work together to facilitate communication and partnership between public and private sectors without creating new opportunities for regulatory capture?
- Should corporate boards and management teams factor the overall well-being of society into the company's long-term strategy—including government fiscal standing and the health of the broader market economy? If yes, how might this consideration reshape long-term strategies?

Key Datasets 2024

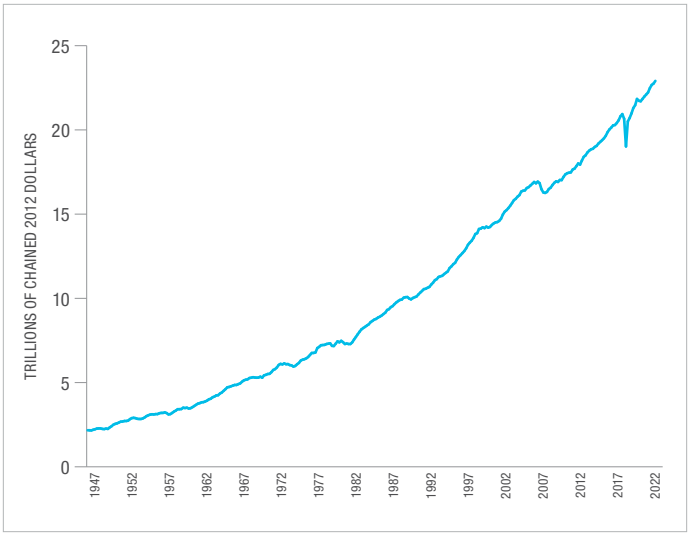
In this section of the report, we updated a handful of key vital statistic datasets from our 2023 Report; the selected datasets are listed below and shown on the following pages.

1. Efficacy & Vitality: *Does our economic system generate growing total wealth?*	• Real GDP growth • Real Output Per Hour in the Nonfarm Business Sector • Total Factor Productivity Annual Change • Fertility Rates
2. Fairness & Social Mobility: *Does the system address the well-being of all members of society, or does it favor distinct groups?*	• Labor Compensation as a Share of GDP • Household Income After Taxes and Transfers • Ratio of CEO to Average Worker Compensation • Income Inequality as Measured by the Gini Coefficient
3. Social Well-Being & Stability: *How does the system strengthen (or weaken) society more broadly?*	• Life Expectancy at Birth • Percent of U.S. Population Living in Poverty • Trust in Institutions • U.S. Billion Dollar Disaster Events
4. Business Environment: *What is the current status and nature of free market competition, and how well is the business community positioned to address current pressures on the system?*	• Number of Publicly Listed Companies • Private Domestic Investment as Percent of GDP • Overall Business Sector Concentration • Patents Originating in the U.S. Annually
5. International Comparisons: *How does the U.S. compare to other democratic societies, and what can we learn from the differences?*	• GDP Per Capita Growth • Government Social Spending as a Percent of GDP • Gini Coefficients After Taxes and Transfers • Life Expectancy at Birth

1. EFFICACY & VITALITY

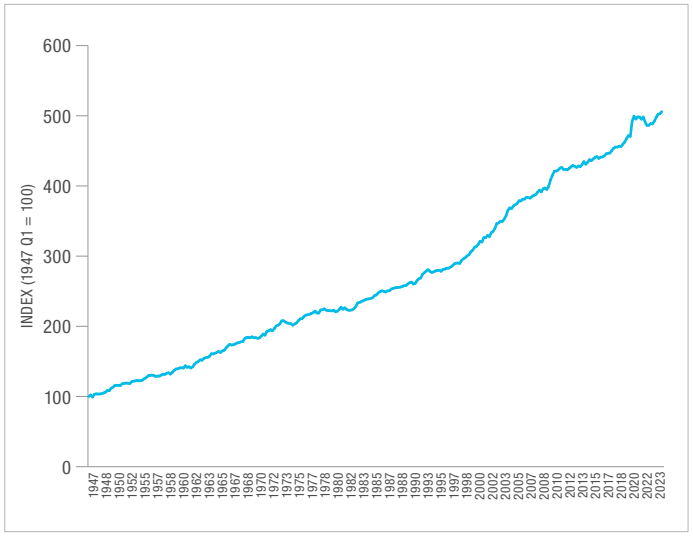
Does our economic system generate growing total wealth?

Real GDP Growth in Chained 2012 Dollars, 1947-2024



Source: U.S. Bureau of Economic Analysis, retrieved from FRED, Federal Reserve Bank of St. Louis, https://fred.stlouisfed.org/series/GDPC1, accessed September 9, 2024.

Real Output Per Hour in the Nonfarm Business Sector, 1947-2024



Source: U.S. Bureau of Labor Statistics, retrieved from FRED, Federal Reserve Bank of St. Louis, https://fred.stlouisfed.org/series/OPHNFB, accessed September 9, 2024.

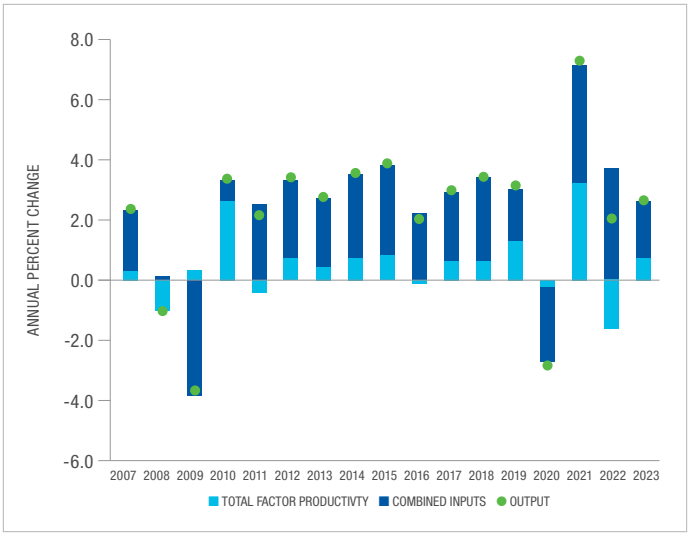
The U.S. economy continues to generate a growing amount of total wealth over time, including a strong bounce back after the 2020-21 COVID-19 contraction. Inflation-adjusted gross domestic product—"real GDP"—measures the quantity of goods and services produced in the nation. Real GDP is equal to the level of domestic production purchased by consumers, businesses, and the government, as well as production exported to other nations. While raw economic output may leave out many factors that matter to a citizen's well-being (e.g., leisure time, health status, or political freedom), GDP does provide a good measure of the resources available to a society, and the growth rate of that output can help describe increases in living standards.

Real GDP increases when the number of workers in the economy increases or when those workers become more productive. Since our Inaugural Report in May 2022, we have seen continued growth in real GDP in line with pre-pandemic expectations. However, compared to previous decades, real GDP has grown more slowly in recent years (excluding the 2020-21 bounce back period), partly due to slower population growth and an aging population. In addition, the growth in workforce productivity has slowed over the last fifteen years. If these trends continue, the U.S. will not get poorer, but living standards will rise less rapidly.

For the economy to grow, either the size of the workforce needs to grow, or workers need to become more productive. Productivity is defined as a worker's output per hour, meaning that to generate greater productivity and economic growth, workers must increase the amount of economic output produced for every hour worked. Productivity can increase dramatically when new technologies allow workers to produce more and can grow over long time horizons as the labor force becomes better educated.

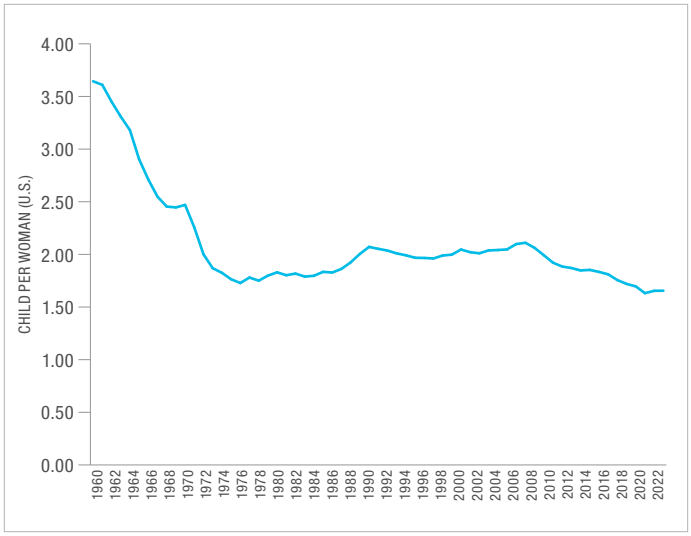
Over the long-term, productivity growth is crucial to increasing living standards. After many centuries, the first substantial increase in living standards occurred due to new technologies invented during the Industrial Revolution. In the U.S., productivity increased during the 1990s when businesses figured out how to use modern computers to increase output per hour of work. Like GDP, productivity has continued to increase but the rate of productivity growth has slowed in recent years. Some argue that artificial intelligence ("A.I.") may provide the next boost to worker productivity.

Total Factor Productivity Annual Change, 2007-2023



Source: U.S. Bureau of Labor Statistics, "Total Factor Productivity—2023," https://www.bls.gov/productivity/, accessed September 14, 2024.

Fertility Rates, 1960-2022



Source: St. Louis Federal Reserve, https://fred.stlouisfed.org/series/SPDYNTFRTINUSA, accessed September 9, 2024.

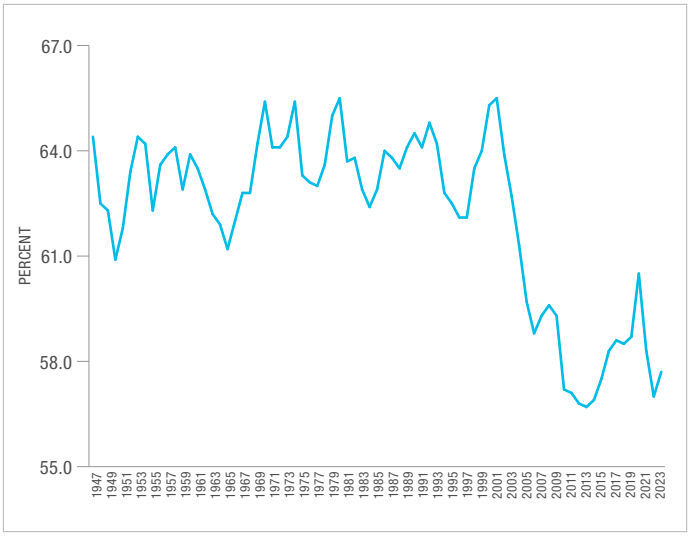
In addition to the productivity of the labor force, total factor productivity captures the share of increases in economic output not accounted for by increases in the inputs to production, including labor and capital. It measures the rate at which technology is improving and the extent to which businesses are making efficient use of inputs to production. Like labor productivity, this measure shows substantial growth in the early 1960s and 1990s, with slowing growth after the Great Recession in 2008. But despite the headwinds, total factor productivity has shown positive growth in 14 of the last 17 years through 2023.

The total fertility rate is defined as simply the number of children per woman, and it has roughly decreased by half since 1960. However, after over a decade of declines, the U.S. fertility rate has held steady over the last few years. The long-term decrease is attributed to a significant increase in access to education by women, the increase in workforce participation by women, decreasing child mortality rates, and the rising cost of bringing up children. Because fertility rates affect the size of the future workforce, this decline could indicate long-term reductions in the growth rate or an eventual drop in GDP. The economic effects of declining fertility rates could be offset by longevity, technological innovations, immigration, and/or social policies to encourage higher birth rates by supporting young families. However, this would require targeted government intervention or innovation that is not guaranteed to be effective even if it does occur.

2. FAIRNESS & SOCIAL MOBILITY

Does the system address the well-being of all members of society, or does it favor distinct groups?

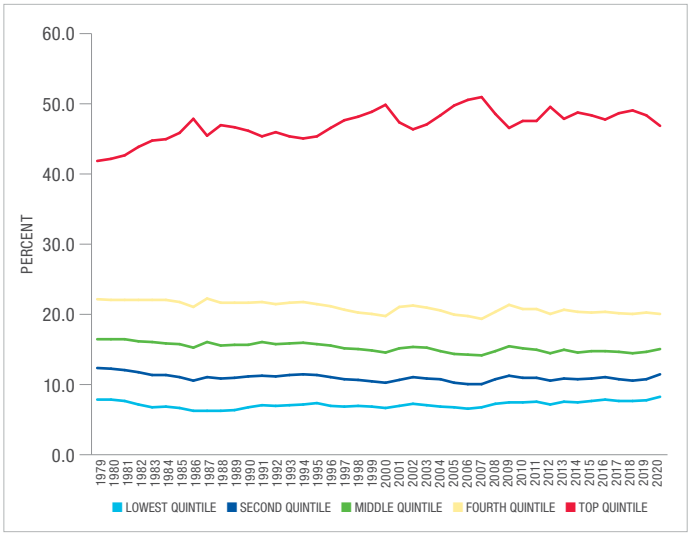
Labor Compensation as a Share of GDP, 1947-2023



Source: BLS Major Sector Productivity data. www.bls.gov/news.release/prod2.nr0.htm, accessed September 14, 2024.

This graph shows the share of total economic output that is paid as compensation to workers and can be compared to the share of output returned to owners of capital. Labor's share of income has declined from highs near 65% in the last half of the twentieth century to approximately 58% in more recent years through 2023. This trend makes it more difficult for standards of living to increase for the majority of workers.

Household Income After Taxes and Transfers, 1979-2020



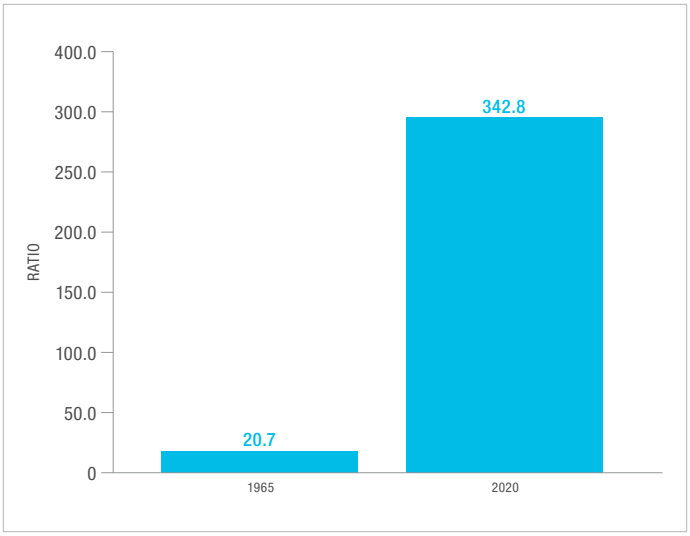
Source: Congressional Budget Office, 2023. "The Distribution of Household Income, 2020," Report 58353, November 14, 2023, accessed September 9, 2024.

Based on the U.S. Census methodology for measuring market income, income for middle-class households has not stagnated over the past four decades, but it has grown substantially more slowly than income at the top. The top 20 percent of the income distribution has seen three times as much growth as the middle 60 percent. Additionally, greater income gains are correlated to higher income. The top 0.01 percent has seen cumulative income growth of over 400 percent over the past four decades.

However, recently published analysis points out that the U.S. Census does not include the majority of federal, state, and local government transfer payments (that effectively increase income in the lower quintiles) or taxes (that decrease income in the higher quintiles) in its income calculations. The recent analysis does not fully answer the question of why market incomes before transfers and taxes have widened significantly, but it does paint a different picture of actual income differences over time.[4]

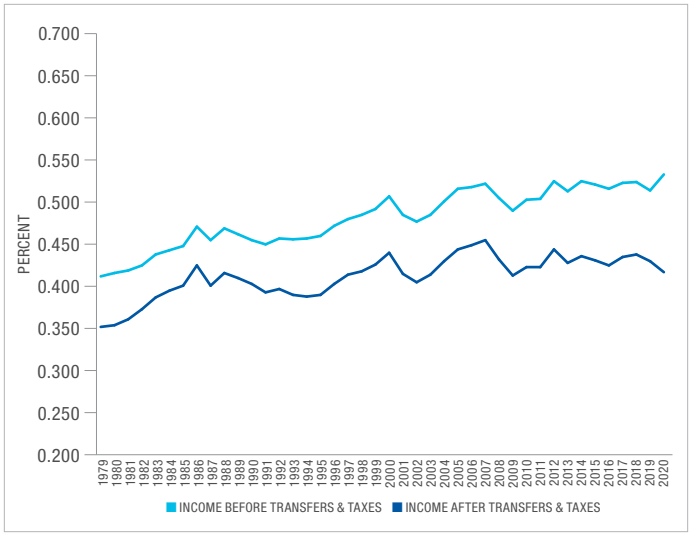
[4] Early, John, Ekelund, Robert, and Gramm, Phil, *The Myth of American Inequality: How Government Biases Policy Debate,* Rowman & Littlefield, 2022.

Ratio of CEO to Average Worker Compensation, 1965 & 2020



Source: Economic Policy Institute, https://www.epi.org/publication/ceo-pay-in-2022/#epi-toc-5/, accessed September 9, 2024.

Income Inequality as Measured by the Gini Coefficient, 1979-2020



Source: Congressional Budget Office, 2023. "The Distribution of Household Income, 2019," Report 59509, November 14, 2023, accessed September 9, 2024.

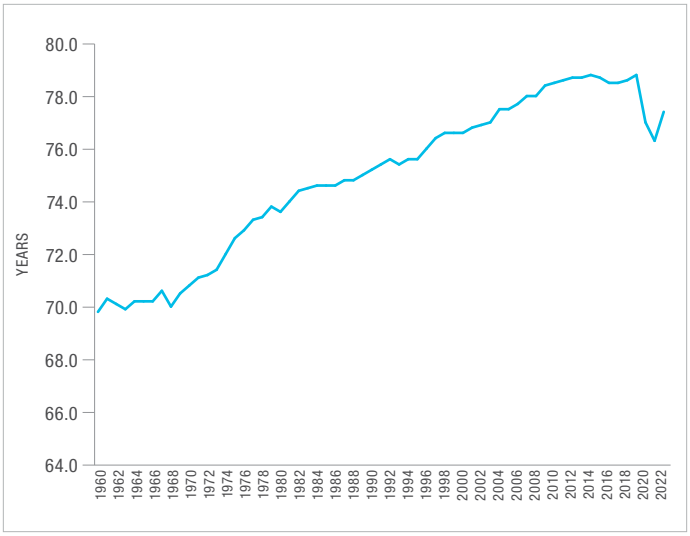
Average annual compensation for CEOs at the top 350 U.S. firms ranked by sales is measured in two ways. Both include salary, bonus, and long-term incentive payouts, but the "granted" measure includes the value of stock options and stock awards" when they were granted, whereas the "realized" measure captures the value of stock-related components that accrues after options or stock awards are granted by including "stock options exercised" and "vested stock awards." The ratios shown here use the "realized" measure of CEO compensation. This gap in income should motivate boards to not only question the current groupthink approach to executive compensation (e.g., is the current level of CEO pay too high?), but also to investigate employee pay across the board (e.g., are we paying rank-and-file employees enough?).

The tax and transfer system is successful at reducing—but certainly not eliminating—income inequality. As measured by the Gini coefficient—a commonly used measure of inequality, for which a value of 0 implies perfect equality and a value of 1 implies maximal inequality—the tax and transfer system reduces income inequality by around 25 percent. After rising rapidly from the late 1970s through the 1990s, inequality growth has slowed. By this measure, since the 2008 financial crisis, post-tax-and-transfer income inequality has declined. It should not come as a surprise that the 2022 Gramm et al analysis mentioned above suggests a lower Gini coefficient than the official reading based on the Census data; the updated estimate indicates an approximate 30% reduction in the coefficient.

3. SOCIAL WELL-BEING & STABILITY

How does the system strengthen (or weaken) society more broadly?

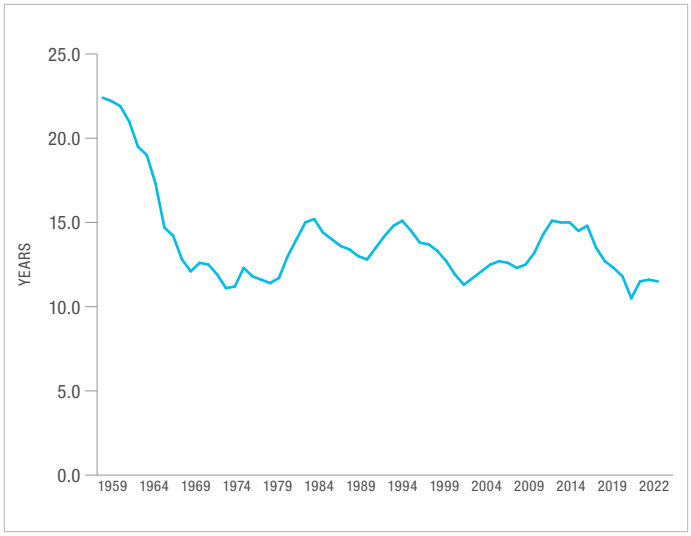
Life Expectancy at Birth, 1960-2021



Source: World Bank, Life Expectancy at Birth, retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/SPDYNLE00INUSA, accessed September 9, 2024.

Average life expectancy at birth has largely increased since 1960 from roughly 70 years to 78 years but has fallen slightly since 2014. Reductions in infectious disease deaths, infant mortality, and heart attack death rates helped boost life expectancy over time. More recently, declining life expectancy at the bottom of the income distribution has helped halt progress, and the impacts of the COVID-19 pandemic are also reflected in recent data. There are also wide gaps in life expectancy across income, race, and geography in the U.S.

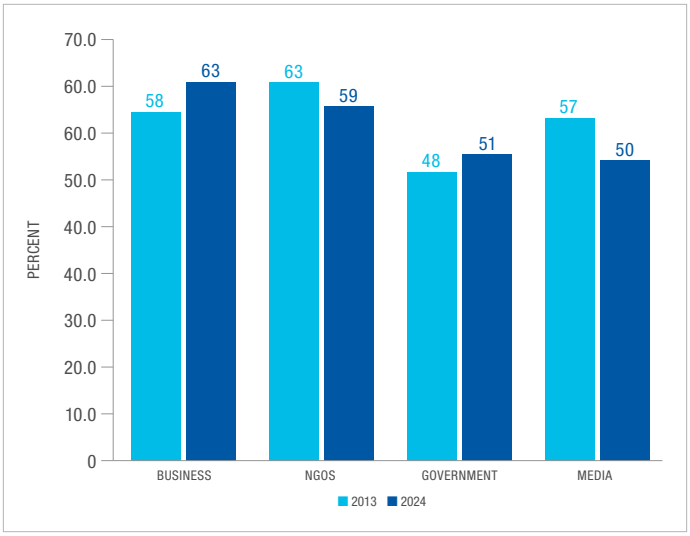
Percent of U.S. Population Living in Poverty, 1959-2022



U.S. Census Report "Poverty in the United States: 2022", September 12, 2023, accessed Sept 9, 2024.

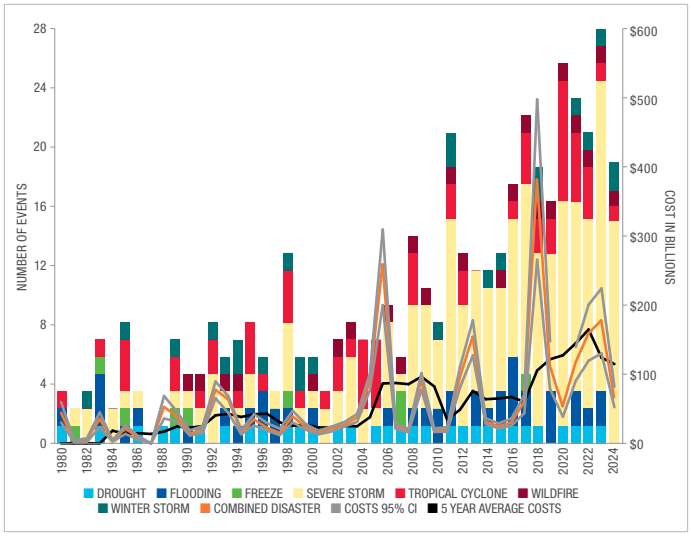
The official poverty measure estimates how many people are unable to afford basic needs using income and the average national cost of food adjusted for inflation. The supplemental poverty measure extends the official poverty measure by taking account of many of the government programs designed to assist low-income families and individuals that are not included in the official poverty measure. Both rates rose during the Great Recession and then trended down through the 2010s. Despite the headlines around income inequality, the percent of the U.S. population living in poverty has improved over time, decreasing from 22% in the early 1960s to closer to 10% in the most recent years.

Trust in Institutions, 2013 versus 2024



Source: Edelman Trust Barometer Global Report; https://www.edelman.com/trust/2024/trust-barometer, accessed September 9, 2024.

U.S. Billion Dollar Disaster Events, 1980-2024



Source: NCEI, NOAA Time Series, https://www.ncei.noaa.gov/access/billions/time-series, updated August 8, 2024, accessed September 9, 2024.

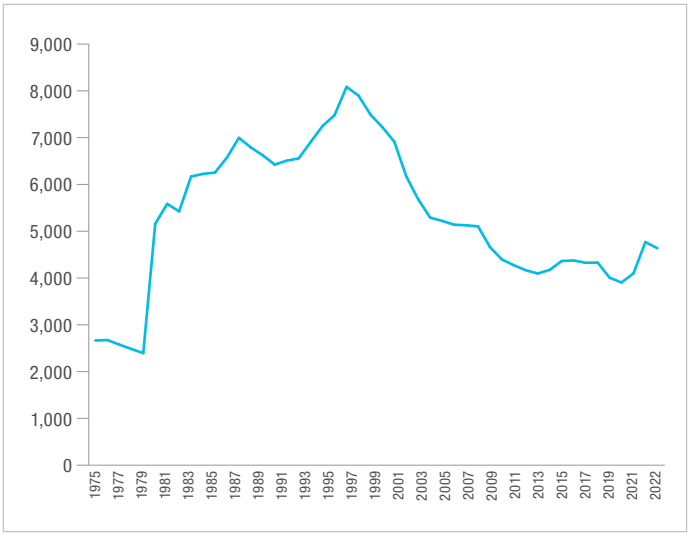
For over two decades, Edelman has conducted an annual trust survey to gauge the public's trust in societal institutions (i.e., business, government, NGOs, media) and institutional leaders. In the most recent addition, the firm surveyed more than 36,000 respondents in 28 different countries asking, "for each [institution], please indicate how much you trust that institution to do what is right." Those that received scores from 60-100 are deemed trustworthy, those from 50-59 are neutral, and those from 1-49 are considered to be distrusted. Currently, business is the only institution to hang on to a trustworthy ranking at 63, while NGOs, government, and media are seen as neither trusted or distrusted; it's worth noting that trust in government has increased slightly likely due to the overall response to the COVID-19 pandemic.

Along with the number and intensity of disaster events, the cost of disasters is also increasing when viewed as an average trendline. In addition to the direct costs of damages and emergency management spending, disaster events can have secondary economic effects including disruption to work, lost productivity, and disruption to supply chains and essential infrastructure. Though the costs of transitioning towards cleaner energy is often discussed, businesses and governments alike should also consider the costs of maintaining the status quo. The costs of continued environmental degradation and the effects of climate change have concrete impacts for society, long-term business interests, and the lives of every American.

4. BUSINESS ENVIRONMENT

What is the current status and nature of free market competition, and how well is the business community positioned to address current pressures on the system?

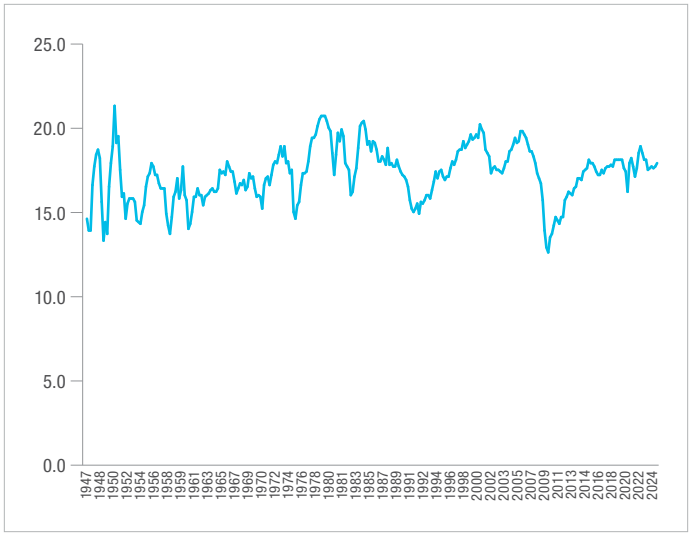
Number of Publicly Listed Companies, 1975-2022



Source: World Bank Group, Listed Domestic Companies—United States, https://data.worldbank.org/indicator/CM.MKT.LDOM.NO?locations=U.S., accessed September 12, 2024.

Since a peak of over 8,000 publicly listed companies in 1996, the U.S. has seen a drop by over 40% to approximately 4,500 public companies by 2022. This trend could be seen as a threat to the dynamism needed to fuel appropriate levels of competition, future growth, and innovation. However, recent analysis by McKinsey cautions that the decline might not be as consequential as it appears. They demonstrate that the drop-off in listings can be attributed primarily to three sectors (banking, industrials, and technology); the drops occurred primarily because of exits between 2001-2010; and 95% of the exits were the result of acquisitions (not company failures). This doesn't negate the fact that business sectors are more concentrated, but it does confirm that firm exits are not necessarily driven by weaker firms being run out of business.

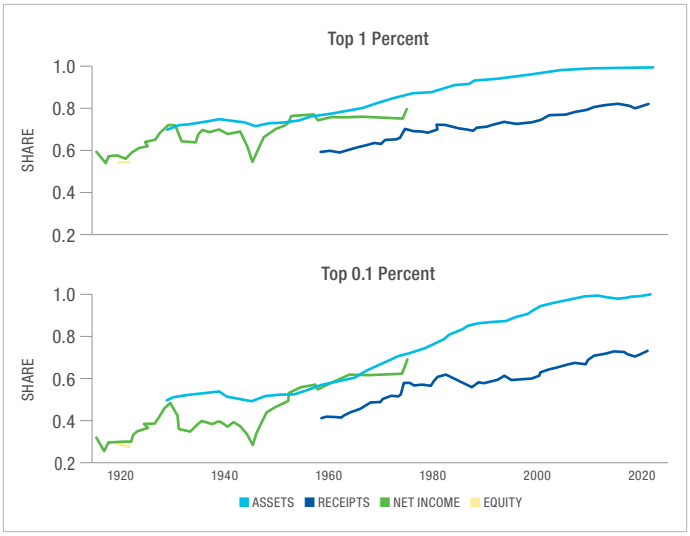
Private Domestic Investment as Percent of GDP, 1947-2024



Source: U.S. Bureau of Economic Analysis, via FRED database, https://fred.stlouisfed.org/series/A006RE1Q156NBEA, accessed September 12, 2024.

Private domestic investment is an indicator of how much businesses are investing within the national borders, and it's an indicator of near-term investment opportunities as well as business leaders' long-term optimism about economic growth at home. Despite a significant dip that coincided with the 2008-2009 financial crisis, private domestic investment in the U.S. has ranged between 15-20% as a share of GDP since the late 1940s. The latest data in the early 2020s have hovered right in the middle of that range, not suggesting strength or weakness when considering this dataset in isolation.

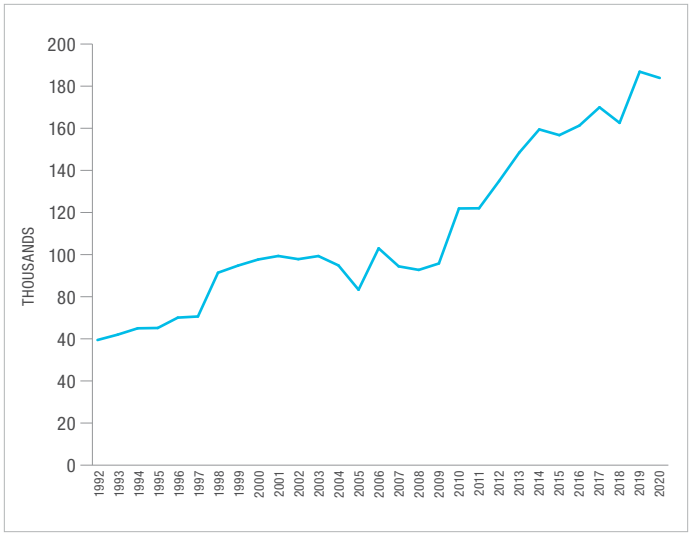
Overall Business Sector Concentration, 1920-2020



Source: Kwon, Spencer Y., Yueran Ma, and Kaspar Zimmermann. 2024. "100 Years of Rising Corporate Concentration." American Economic Review, 114 (7): 2111–40. p. 2121.

In February 2023, researchers at the University of Chicago's Becker Friedman Institute published a working paper focused on market concentration statistics over the last 100 years. They found that corporate concentration has increased persistently over the time period (either asset share or sales share of top businesses). In addition, they concluded that rising concentration in an industry coincided with increased technological intensity and higher fixed investment.

Patents Originating in the U.S. Annually, 1992-2020



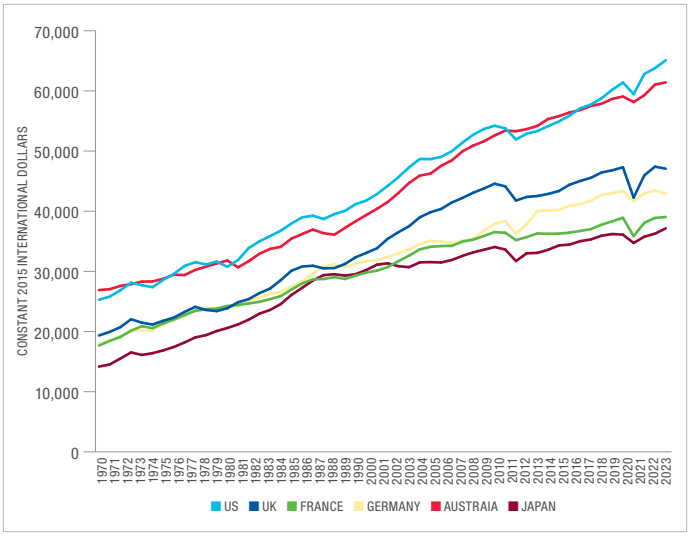
Source: U.S. Patent and Trademark Office, retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/PATENTUSALLTOTAL, accessed September 14, 2024.

Another measure of the scale of innovation is the number of patents originating in the U.S. annually. A greater amount of new intellectual property rights granted signifies more innovation taking place. This figure plots the total number of patents where the first named inventor resides in the U.S. Total patents are the sum of utility, plant, design, and reissue patents granted by the U.S. Patent and Trademark Office. The number of patents granted has roughly doubled since the Great Recession in 2009. While this may signal increased innovative activity, it may also reflect the patenting of a growing range of ideas (e.g. business practices) or increased low-quality patents (that do not change activity much). Still, the long-term trend points to the economic system spurring ongoing innovation.

5. INTERNATIONAL COMPARISONS

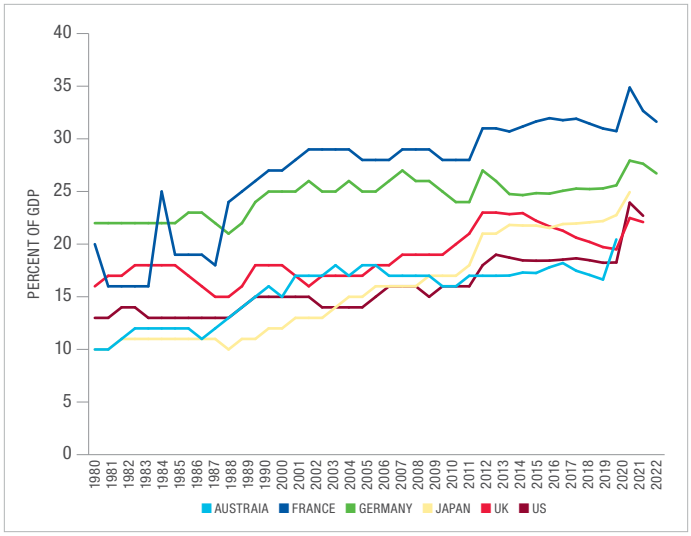
How does the U.S. compare to other democratic societies, and what can we learn from the differences?

GDP Per Capita Growth, 1970-2023



Source: World Bank national accounts data, and OECD National Accounts data files, https://data.worldbank.org/indicator/NY.GDP.PCAP.KD, accessed September 14, 2024.

Government Social Spending as Percent of GDP, 1980-2022

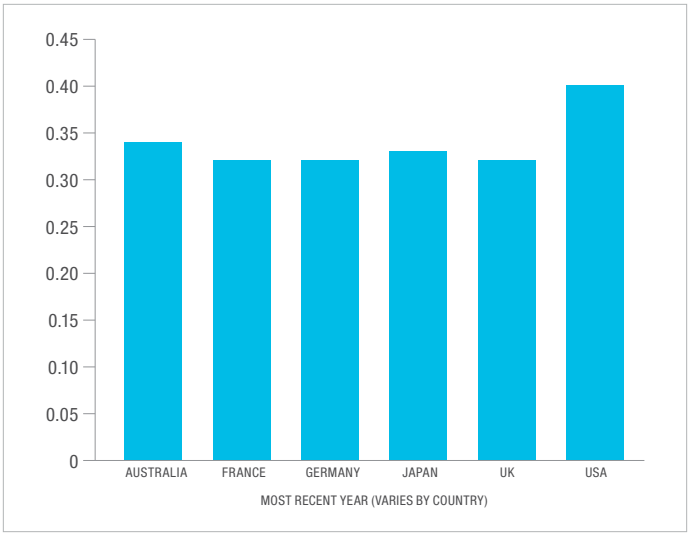


Source: OECD Data Explorer, https://data-explorer.oecd.org/, accessed September 14, 2024.

One core fact when comparing the U.S. economy to many of its large, advanced economy peers is that the U.S. has a higher level of output per capita. This figure shows the level of GDP per capita for the U.S. and 5 other nations from 1970 to the present. The data are shown in constant prices (adjusting for inflation) and in international dollars (adjusting for exchange rates and price differences across countries) to try to show an apples-to-apples comparison of GDP per person. Growth rates over time have been reasonably similar, with all 6 economies growing between 100 and 160 percent over this period, with the U.S. maintaining its lead in output per capita throughout. Output per capita is a function of the share of the population working, the number of hours worked per worker, and the productivity of labor (output per hour).

France leads the five other comparison countries with over 30% of social spending as a percentage of GDP, with Germany coming in second about 5 percentage points lower. Social expenditure comprises cash benefits, direct in-kind provision of goods and services, and tax breaks with social purposes. Benefits may be targeted at low-income households, the elderly, disabled, sick, unemployed, or young persons. To be considered "social", programs must involve either redistribution of resources across households or compulsory participation. Social benefits are classified as public when the government (that is central, state, and local governments, including social security funds) controls the relevant financial flows. All social benefits not provided by the government are considered private. Private transfers between households are not considered as "social" and not included here.

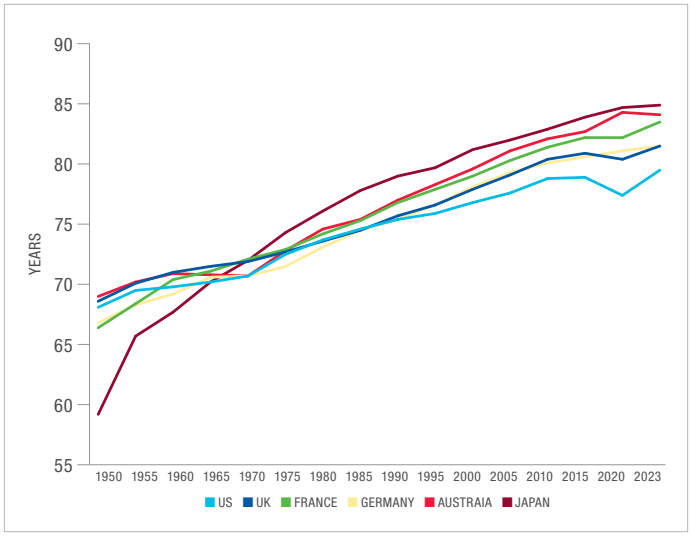
Gini Coefficients After Taxes and Transfers



Source: OECD via Our World in Data, https://ourworldindata.org/grapher/economic-inequality-gini-index, accessed September 14, 2024.

This figure plots average inequality for income after taxes and transfers measured using the Gini coefficient for the most recent year available for Australia, France, Germany, Japan, the United Kingdom, and the United States. The U.S. has the highest Gini coefficient measured at 0.40, while the other five countries fall somewhere between 0.30 and 0.35. Though some scholars rightly question why some government transfers are excluded from this analysis, the overall result doesn't come as a surprise. Alternative analysis suggest the U.S. might be closer to the comparison countries, but the recommended adjustments are not likely to change the relative position of the U.S. overall.

Life Expectancy at Birth, 1950-2023



Source: World Bank World Development Indicators, https://www.worldometers.info/demographics/life-expectancy/#countries-ranked-by-life-expectancy, accessed September 14, 2024.

Since the 1980s, the U.S. has lost considerable ground on life expectancy to the selected peer nations. Japan has gained almost 25 years since 1950, and Australia has gained over 15 years. Notably, life expectancy in the U.S. has only risen about 10 years over the same period. Coupled with birth rates, life expectancy impacts population size and growth rates. With falling birth rates and low-growth in life expectancy (and assuming steady immigration rates), population growth can face significant headwinds.

Deep Dive | Taking a Closer Look at Industrial Policy

"A modern American industrial strategy identifies specific sectors that are foundational to economic growth, strategic from a national security perspective, and where private industry on its own isn't poised to make the investments needed to secure our national ambitions."

Jake Sullivan, National Security Advisor, April 2023

"To its supporters, […] industrial policy is essential to respond to [international] state-led development, secure a supply of critical materials and products, and develop technologies to preserve the planet. […] To its critics, such a policy inevitably distorts the free market and rewards companies not for the quality of their products and services but for their skill at lobbying lawmakers."

Council on Foreign Relations, September 2023

"The wisest way to pursue industrial policies is to target the identified problem as precisely as possible while minimizing damaging side effects on international cooperation, trade openness, and domestic economic performance. [When this design is neglected], a fundamental shift in ideology towards nationalist and interventionist approaches is really hard to contain."

Martin Wolf, *Financial Times,* June 2024

INTRODUCTION

Targeted government interventions in market economies, better known as industrial policies, have existed for a very long time. The degree and types of industrial policies vary by region of the world and by individual country, and some of the oldest forms—tariffs and import rules—have long governed global trade between nations. However, in recent years, industrial policy of many different flavors is on the rise, with one study estimating that the number of global industrial policy interventions have increased more than 40 times since 2010.[5] As usage of industrial policy increases both within the U.S. and globally, understanding how it is being used and the resulting impacts are increasingly important.

This tremendous growth should not come as a complete surprise given the overall level of government spending. According to the International Monetary Fund (IMF), spending by the U.S. government has grown from 13% of GDP in 1950 to 36% of GDP in 2022.[6] If that sounds worrisome, the increase in spending has been even more dramatic in other developed nations; in 2022, the governments of Italy and France spent 57% and 58% of their national GDP, respectively.[7]

In this deep dive, our objective is to provide an impartial analysis of industrial policy in four sections:

DEFINITION

What exactly is industrial policy, and what are the arguments for and against government intervention in the markets?

DEGREE

How extensive is industrial policy, and what proof do we have that it is on the rise?

EFFECTIVENESS

What are the impacts of industrial policy, both good and bad?

EXAMPLES

What can we learn from historical case studies including the successes, failures, and policies where the outcome is still uncertain?

The datasets we present here confirm industrial policy interventions are increasing in number and that the effectiveness of these interventions is very difficult to measure due in part to the great diversity of programs and objectives. We did, however, identify a few historical successes and failures on an individual level. And even if industrial policies were proven effective broadly and measuring success or failure was clearer on the individual action level, policy makers still face the dilemma of how long government spending at current levels is sustainable. Lastly, our findings lead us back to important questions from past research around how policies are shaped by the same large corporations and industries they are supposed to govern, and about the deteriorating public trust in government's ability to solve big problems.

[5] Juhász, Réka; Lane, Nathan; and Rodrik, Dani, "The New Economics of Industrial Policy" (August 2023), prepared as a draft report for the *Annual Review of Economics*, p. 37 (Figure 3.1).

[6] International Monetary Fund Datamapper, https://www.imf.org/external/datamapper/exp@FPP/FRA/JPN/GBR/SWE/ESP/ITA/ZAF/IND/USA, accessed August 9, 2024.

[7] International Monetary Fund Datamapper, https://www.imf.org/external/datamapper/d@FPP/FRA/JPN/GBR/SWE/ESP/ITA/ZAF/IND/USA, accessed August 9, 2024.

Deep Dive | Definition, Datasets, and Examples

1. Definition: *What exactly is industrial policy, and what are the arguments for and against government intervention in the markets?*	• Industrial policy defined • Rationale for industrial policy, and real-world caveats • What's in, what's out, and what is in-between
2. Degree: *How extensive is industrial policy, and what proof do we have that it is on the rise?*	• General context – Government spending as percent of GDP, 1930-2022 – Number of global industrial policy interventions, 2010-2022 – Industrial policy media attention, 1990-2023 – Industrial policies by industry sector, 2010-2022 • Specific applications – Government and private R&D expenditures as share of GDP, 2010-2022 – Innovation tax incentives, 2000-2022 – Global Public Energy R&D Spending, 2015-2022
3. Effectiveness: *What are the impacts of industrial policy, both good and bad?*	• U.S. Goods and Services Trade Balance, 1960-2023 • Global GDP Growth Projections Through 2025 • South Korea Heavy Chemical Industry Impacts, 1970s • Inflation Reduction Act Major Project Status, 2024 • CHIPS Act Impact on U.S. Manufacturing Investment, 2016-2024 • Americans' Preference for Government Action, 1992-2023
4. Examples: *What can we learn from historical policy case studies including the successes, failures, and policies where the outcome is still uncertain?*	• California High Speed Rail • The Defense Advanced Research Projects Agency (DARPA) • Clean Energy Policy and Solyndra

Deep Dive | Definition

INDUSTRIAL POLICY DEFINED

What exactly is industrial policy, and what are the arguments for and against government intervention in the markets?

Industrial policy can be broadly defined as government action that provides targeted, intentional support to specific industries. This can include a range of goals, types of policy designs, channels of impact, and policy scopes. Common industrial policy goals include strategic national autonomy (supporting industries against international competition), accelerated crisis management (e.g. climate change-focused energy programs, or the U.S. push for industrial production related to WWII), promotion of productivity and growth, and provision of public goods.[8] More recently, shortages and shipping delays during the COVID-19 pandemic has led resilience and supply chain strength to become increasingly common policy goals.

In addition to broad intentions, industrial policies encompass a range of designs including mission-oriented, place-based, sectoral, and technology-focused programs. *Mission-oriented* policies are typically larger packages of policies intended to foster innovation and technology development across multiple sectors. This can include innovation policies and regulatory measures focused on societal challenges. Examples include the push to pivot the U.S. industrial base for WWII, the space race, and efforts to respond to climate change.[9]

Place-based policies aim to create jobs, increase productivity and/or promote growth within a specific region. One example of place-based policies are innovation clusters, which aim to create localized knowledge spillovers and other positive externalities by connecting researchers, large firms, and start-ups.[10]

Sectoral policies target a sector or group of related sectors, usually to increase innovation, productivity, and/or growth. Recent concerns about strategic autonomy related to the rise of China, supply chain resiliency related to COVID-19 challenges, and the impacts of climate change can also be linked to sectoral strategies such as supporting domestic semiconductor development as well as clean energy and related sectors such as lithium batteries and electric vehicles (EVs). *Technology-focused programs* either promote innovation or the diffusion of technologies with longer-term goals of increasing growth, boosting productivity, and/or improving standards of living. It is also important to note that these categories often overlap.

Industrial policy tools can be grouped in broad categories (supply-side, demand-side, and governance), but this encompasses a wide range of tools such as tariffs and other trade policies, subsidies and tax policies, R&D investment, procurement, and public provision of inputs like land or training.[11] *Supply side* interventions can either focus on creating changes to the environment in which firms are operating or on factors that impact firm performance. This could include industry framework interventions such as entrepreneurship policies, intellectual property standardization policies, and/or labor mobility improvement. Alternatively, if

[8] Criscuolo et al. 2022, p. 16.

[9] For more on these themes, see Mazzucato, Mariana, *The Entrepreneurial State: Debunking Public vs. Private Sector Myths,* Penguin Books, 2013 (latest edition, 2023).

[10] Hanson, Gordon; Rodrik Dani, "How Does Place Based Policy Work?", Reimagining the Economy Program, Harvard Kennedy School, 2023.

[11] Juhász, Réka; Lane, Nathan; and Rodrik, Dani, "The New Economics of Industrial Policy" (August 2023), prepared as a draft report for the *Annual Review of Economics*, p. 4.

focused more on firm performance, supply-side interventions may include subsidies, tax credits, R&D or infrastructure investment, or training and education programs.

Demand side interventions can include government procurement or product regulations. *Governance* efforts such as cooperative industry boards and other initiatives facilitate coordination and communication among the private sector, research institutions, and government actors.[12] Additionally, policies may be targeted (restricted to firms based on requirements about their activity and/or location) or horizontal (available to all firms).[13]

The great range of instruments used to pursue industrial policy makes it more complicated to quantify how much government spending is, in fact, related to industrial policy goals and which types of industrial policy are more or less effective. The diversity of designs and tools that are employed towards industrial policy also make it more dynamic and customizable for particular goals and contexts.

RATIONALE FOR INDUSTRIAL POLICY AND REAL-WORLD CAVEATS

The rationale supporting industrial policy is summarized in a 2023 draft paper prepared for the *Annual Review of Economics,*[14] and encompasses three main arguments: (1) promoting positive externalities, (2) supporting coordination for improved market function, and (3) providing activity-specific public inputs to benefit companies or industries. By *promoting positive externalities,* government policy aims to motivate productive activity that benefits society (e.g., national security, broader learning) where the societal benefits are not recouped in the revenues generated. When *supporting coordination for improved market function,* the government might invest in complementary goods or services that a related producer or sector needs to operate profitably, where the complementary production is absent otherwise (or not operating at scale). Distinct from generally beneficial government inputs such as law and order, education, and infrastructure, *activity-specific public inputs* single out companies or industries that need extra support, e.g., allocating public land for a new port to accommodate international liquified natural gas shipping.

Even if they accept the stated objectives of industrial policy, critics point to real-world caveats that can undermine policy success. First, opponents of government interventions assert that it's almost impossible in a practical sense for policy makers to have all the information they need to craft the right action(s). With the volume and complexity of information generated either externally in the market or internally within each firm, it's reasonable to doubt the policy designer's ability to be comprehensive. Second, critics observe that even if experts had all the information they needed to design the perfect intervention, the politicians responsible for enacting the new policy may lack the will to implement it as designed or be influenced by industry players to tweak policy to their benefit. Putting these two concerns together, the critique is often summarized as "the government is not capable of picking the right winners and losers."

[12] Criscuolo et al. 2022, p. 19-20.
[13] Criscuolo et al. 2022, p. 14.
[14] Juhász et al. 2023, pp. 5-6.

Deep Dive | Degree

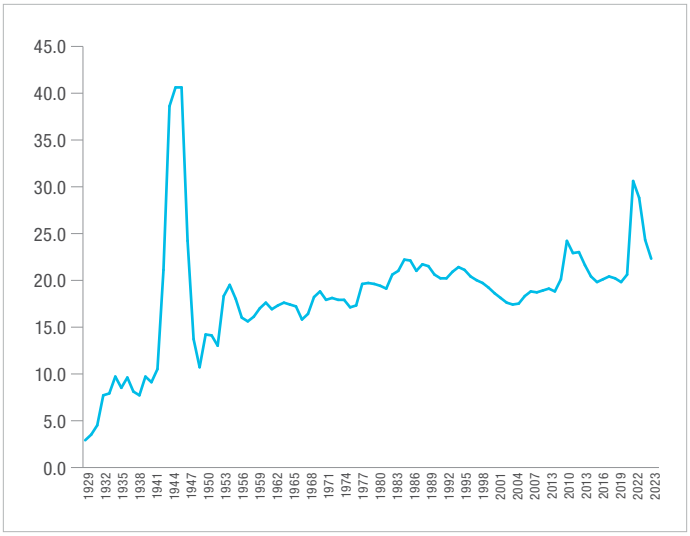
EXTENSIVENESS OF INDUSTRIAL POLICY

How extensive is industrial policy, and what proof do we have that it is on the rise?

The datasets we identified confirm that industrial policy interventions have grown significantly in recent years. Evidence includes the overall growth of government spending relative to GDP, scholarly counts of actual industrial policy actions over time, and the increasing media attention focused on industrial policy.

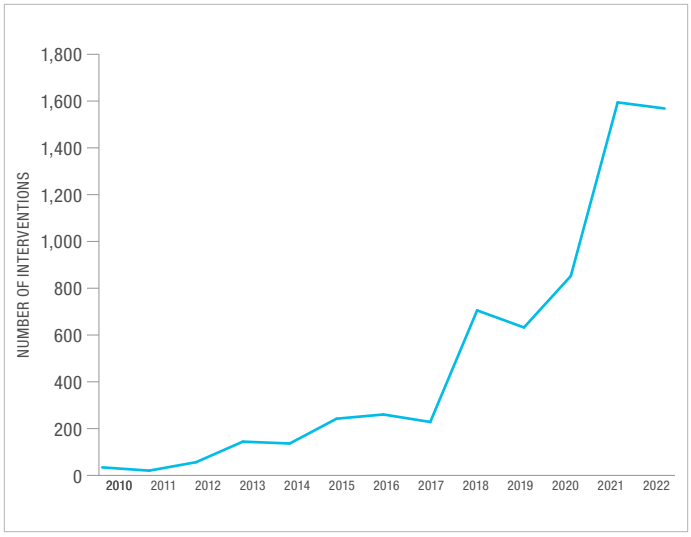
GENERAL CONTEXT

Government Spending as Percent of GDP, 1930-2023



Source: U.S. Office of Management and Budget, retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/FYONGDA188S, accessed September 15, 2024.

Number of Global Industrial Policy Interventions, 2010-2022

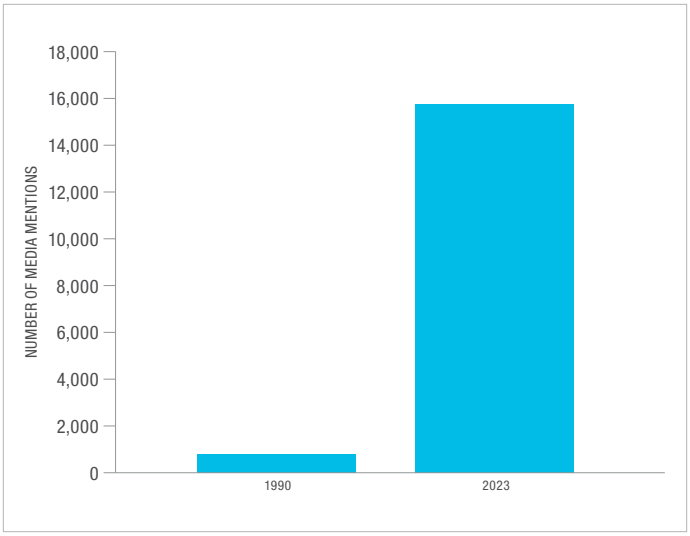


Source: Juhász, Réka; Lane, Nathan; and Rodrik, Dani, "The New Economics of Industrial Policy" (August 2023), prepared as a draft report for the Annual Review of Economics, p. 37.

The U.S. Office of Management and Budget, which assists Presidential administrations in meeting policy, budget, management, and regulatory objectives, recently published the latest data on government spending. Using the St. Louis Fed's FRED database, we find that federal spending (or outlays) are hovering above 20% of GDP for the last 10+ years, with the sea-change in federal spending occurring in the aftermath of the Great Depression. Federal spending in the U.S. has risen from about 5% of GDP in the 1930s to over 22% of GDP in 2023.

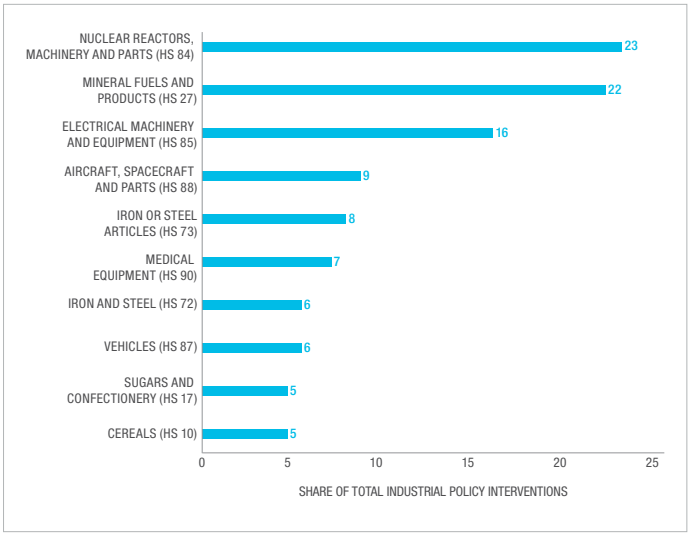
In their 2023 draft report for the *Annual Review of Economics,* "The New Economics of Industrial Policy," professors Réka Juhász, Nathan Lane, and Dani Rodrik take a closer look at the recent acceleration and pervasiveness of industrial policy around the world. According to their estimates, the number of industrial policy interventions by governments has grown exponentially from 34 in 2010 to 1,568 in 2022.

Industrial Policy Media Attention, 1990-2023



Source: Evenett, Simon; Jakubik, Adam; Martín, Fernando; and Ruta, Michele, "The Return of Industrial Policy in Data," IMF Working Paper (January 2024), p. 5.

Industrial Policies by Industry Sector, 2010-2023



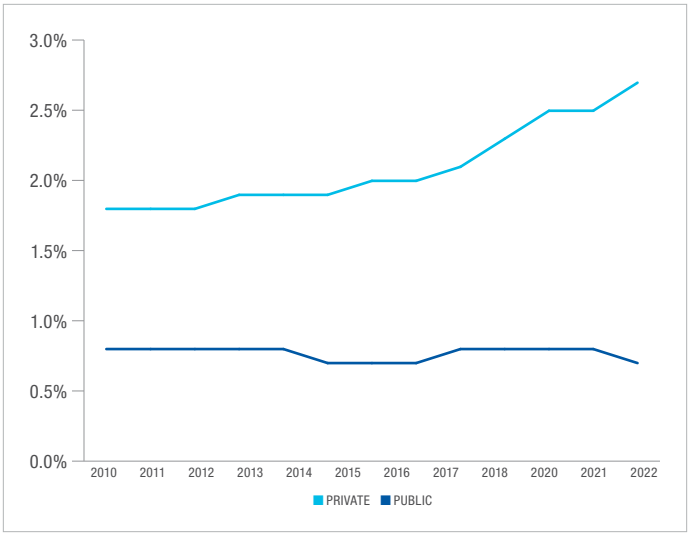
Source: Juhász, Réka; Lane, Nathan; and Rodrik, Dani, "The New Economics of Industrial Policy" (August 2023), prepared as a draft report for the Annual Review of Economics, p. 40.

Not only have the number of industrial policy actions increased, but the press is also taking more notice. In January 2024, researchers at the International Monetary Fund estimated that the press mentions of industrial policy have increased from less than 1,000 in 1990 to over 16,000 in 2023. This increase in press coverage is likely driven by the increase in activity as well as the publicity and promotion that governments are increasingly willing to embrace.

Juhász et al. broke down the industrial policy interventions tallied from 2010-2023 by national income quintiles and by industry sector. They estimate that over 85% of actions took place in nations belonging to the top 2 income quintiles, and this chart reflects the industries targeted in these 2 quintiles. Nuclear power plants (and supporting technologies), mineral mining and products, and electrical machinery and equipment (including semiconductor manufacturing) led other sectors, accounting for over 60% of policy actions.

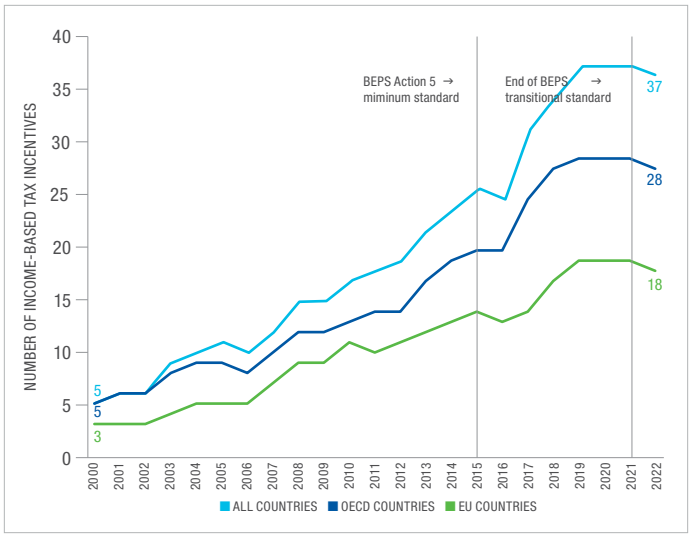
SPECIFIC APPLICATIONS

Government and private R&D expenditures as share of GDP, 2010-2022



Sources: U.S. Bureau of Economic Analysis, Gross Domestic Product [GDP], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/GDP, accessed September 15, 2024; and NCSES InfoBrief, January 2024.

Innovation Tax Incentives, 2000-2022

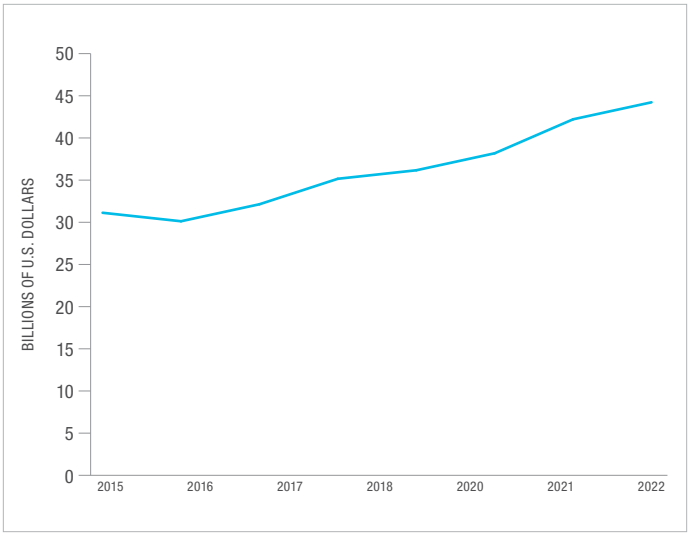


Source: Cabral et al., "A Time Series Perspective on Income-Based Tax Support for R&D and Innovation," OECD, 2023, p. 14.

The growth of industrial policy activity is reflected in public and private R&D spending trends. Technological innovation has the greatest potential to advance living standards by increasing the productivity of the workforce and improving quality of life. Investments in basic research lead to transformative, breakthrough innovations. This figure plots private and government spending on R&D as a share of total output. Research and development spending by private companies has steadily increased throughout this period, in part driven by industrial policy incentives.

More proof that industrial policy interventions are proliferating is found in the growth of government tax incentives offered to drive innovation in private industry. The 2023 OECD Working Paper 62, attempts to quantify the expansion of income-based tax incentives ("IBTIs") for R&D and innovation. In addition (and not shown on the chart), the number of countries offering IBTIs has grown from 5 to 27.

Global Public R&D Spending, 2015-2022



Source: World Energy Investment 2023: https://www.iea.org/reports/world-energy-investment-2023, and IEA Energy Technology RD&D Budgets database (2023): https://www.iea.org/data-and-statistics/data-product/energy-technology-rd-and-d-budget-database-2, accessed September 15, 2024.

According to the International Energy Agency ("IEA"), government investment in energy-related R&D has increased significantly since 2015. R&D expenditures have grown from approximately $30 billion to over $40 billion globally; spending in North America and Europe has grown from $16 billion to $23 billion while Chinese spending alone has almost doubled from $8 billion to $15 billion.

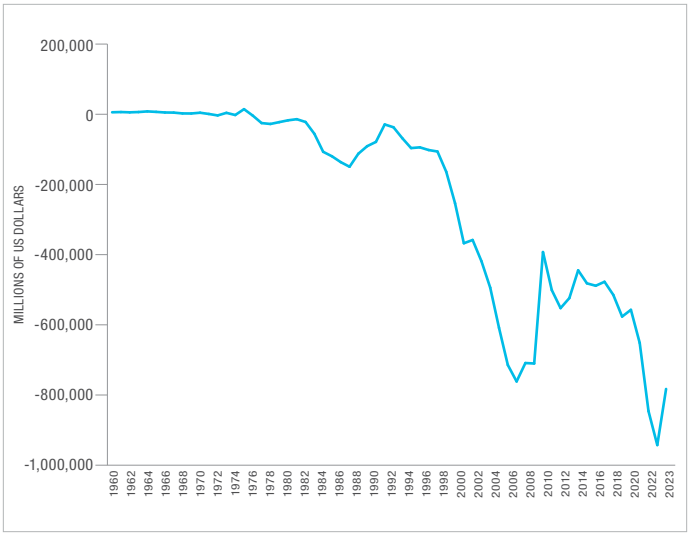
Deep Dive | Effectiveness

EFFECTIVENESS OF INDUSTRIAL POLICY

What are the impacts of industrial policy, both good and bad?

Scholars caution that measuring the effectiveness of industrial policy is difficult at best. Several recent papers have confirmed the complexities of measuring industrial policy performance, and they also point out that until recently, there has been a scarcity of econometric attempts at measuring policy effectiveness.[15] With that in mind, we present datasets that begin to tell the story of industrial policy effectiveness, with some broad datasets as well as more policy-specific datasets. This is a work in progress, and we anticipate much more concrete analyses becoming available over the next decade.

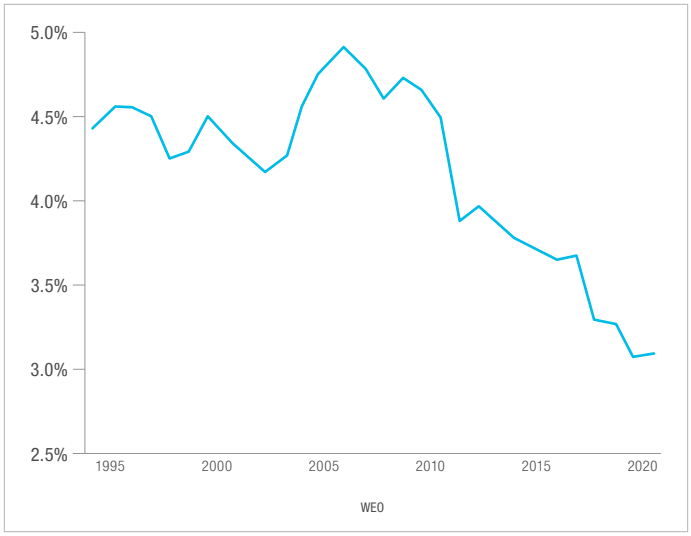
U.S. Goods and Services Trade Balance, 1960-2023



Source: U.S. Bureau of Economic Analysis, International Trade in Goods and Services, https://www.bea.gov/data/intl-trade-investment/international-trade-goods-and-services, accessed September 15, 2024.

A trade deficit occurs when a nation imports more than it exports, and trade deficit trends can be used as a broad measure of industrial policy effectiveness to the extent government interventions are enacted to encourage production of goods and services within the country or strengthen national competition versus foreign industries. The U.S. trade deficit has grown from close to $200 billion in 1999 to over $700 billion in 2024.

Global GDP Growth Projections Through 2025



Source: IMF Blog (April 2024), https://www.imf.org/en/Blogs/Articles/2024/04/10/world-must-prioritize-productivity-reforms-to-revive-medium-term-growth, accessed September 15, 2024.

According to the International Monetary Fund, projections for global growth over the following five years has declined since the 2008-2009 financial crisis. From 1995 through 2010, analysts projected 4-5% future economic growth, but projections have grown more pessimistic since then. Recent projections for future growth through 2025 are closer to 3%. Like the U.S. trade deficit trend, this data is not a definitive sign that industrial policy is ineffective, but it doesn't build confidence either.

[15] Juhász et al. 2023, p. 10, and Lane, Nathan, "The New Empirics of Industrial Policy.," *Journal of Industry, Competition, and Trade* 20, 209–234 (2020), p. 1.

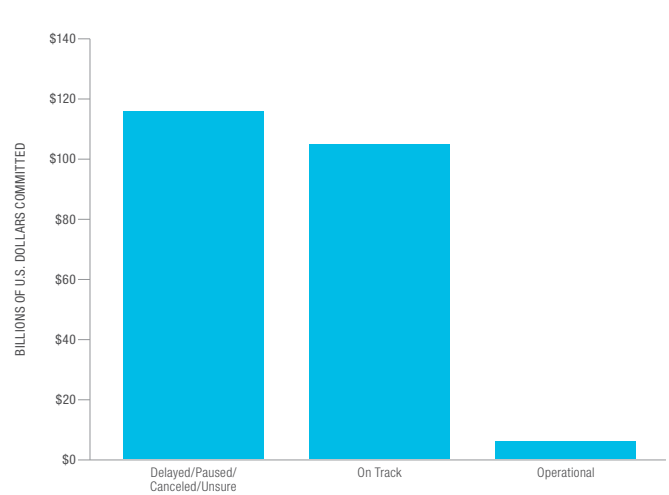
South Korea Heavy Chemical Industry Impacts, 1970s

Industrial Policy Impacts Observed

1. HCI sector increased production by 100% and productivity by 60%
2. Policies led to HCI products achieving comparative advantage in global markets
3. Downstream sectors with strong linkages to HCI-related industries expanded as well

Source: Lane, Nathan, "Manufacturing Revoltions: Industrial Policy and Industrialization in South Korea," 2022, p. 3.

Inflation Reduction Act Project Status, 2024

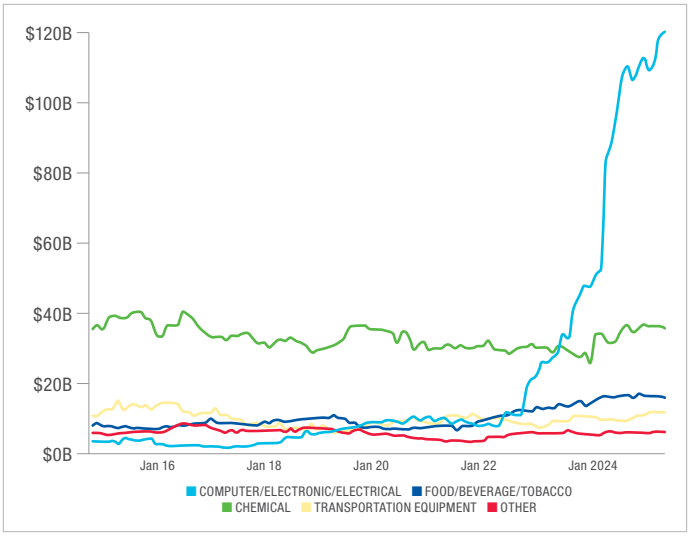


Source: *Financial Times*, "Delays Hit 40% of Biden's Major IRA Manufacturing Projects," August 11, 2024.

Oxford University Professor Nathan Lane studied South Korea's 1973-1979 industrial policy targeting the Heavy and Chemical Industry ("HCI") to understand its short-term and long-term impacts on industrial development. In his analysis, the policies shifted South Korea "from a light export economy to an industrial powerhouse." The selected industries demonstrated significant increases in production and productivity compared to non-targeted sectors.

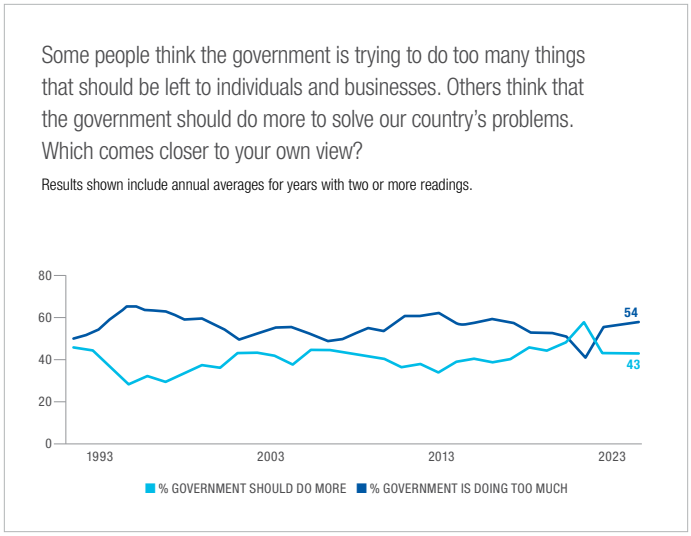
Research by the *Financial Times* highlights that about 40% of the major manufacturing projects supported under the Biden administration's Inflation Reduction Act and the CHIPS and Science Act (both enacted in 2022) have been delayed or paused; another 15% of major projects are in limbo. In monetary terms, almost $120 billion in government policy investment is not proceeding on time or as planned. Companies said deteriorating market conditions, slowing demand, and lack of policy certainty in a high-stakes election year have contributed to the delays and changes.

CHIPs Act Impact on U.S. Electric Manufacturing Investment, 2016-2024



Source: American Compass, "Chipping Away," https://americancompass.org/chipping-away/, accessed August 28, 2024.

Americans' Preference for Government Action, 1993-2023



Source: Gallup, "Public Firm in View That Government Is Doing Too Much," October 24, 2023.

Despite the delays outlined in the previous dataset, both Intel and the Boston Consulting Group are optimistic about the longer-term impacts of the CHIPS and Science Act. Intel asserts that it is on track to be the second largest global chip manufacturer by 2030. The Boston Consulting Group, partnering with the Semiconductor Industry Association, projects that U.S. fabrication capacity will triple—and that U.S. advanced logic capacity will jump from 0% to 28%—by 2032. In addition, U.S. Census Bureau data shows that electrical manufacturing is driving America's recent manufacturing boom

Some people think the government is trying to do too many things that should be left to individuals and businesses. Others think that government should do more to solve our country's problems. Gallup's latest poll gauging Americans' preference for government action shows that 54% believe the government is doing too much, while 43% think the government should do more. When it comes to government regulation of business and industry, 44% think there's too much while 25% say there is too little. Absent hard evidence that government intervention is helping America and its citizens, these views are unlikely to change much.

Deep Dive | Case Studies

INDUSTRIAL POLICY EXAMPLES

What can we learn from historical policy case studies including the successes, failures, and policies where the outcome is still uncertain?

We now turn to a few specific case studies of industrial policy to understand how government intervention works, or doesn't work, in real-world contexts.

The cases we review include:

- California High-Speed Rail
- The Defense Advanced Research Projects Agency (DARPA)
- Clean Energy Policy and Solyndra

California High-Speed Rail

California began considering a high-speed rail project in the 1980s, and after a long process of brainstorming, identifying funding, and determining initial routes, the groundbreaking ceremony for the beginning of construction was held in 2015. Construction for the project is still ongoing. California's high-speed rail project is a significant transportation infrastructure development that is intended to provide passenger rail services and improve connectivity between regions.[1] The scope of the project is ambitious, aiming to connect San Francisco and Los Angeles followed by expansions linking Sacramento and San Diego into the rail network. The project also aims to coordinate regional partners and local governments to implement "a statewide rail modernization plan that will invest billions of dollars in local and regional rail lines."[2] The goals for the high-speed rail project include improving mobility, fostering economic development, providing local jobs, and offering environmental benefits as a zero emission mass transit option.[3]

POLITICAL DECISION-MAKING: ROUTES, TIMELINES, AND COSTS

California's high-speed rail project has been plagued by concerns about funding, costs, and delays, especially as related to the expansion or diversion of routes due to political compromises. The most significant political decisions that have impacted the high-speed rail project include: extending the route through the Mojave Desert and Central Valley farm belt, beginning construction in

[1] California High Speed Rail Authority. "About California High Speed Rail." 2024. Retrieved from: https://hsr.ca.gov/about/high-speed-rail-authority/.
[2] Vartabedian, R. "How California's Bullet Train Went Off the Rails." NYTimes. October 9, 2022. Retrieved from: https://www.nytimes.com/2022/10/09/us/california-high-speed-rail-politics.html.
[3] California High Speed Rail Authority. "About California High Speed Rail." 2024.

the Central Valley instead of in San Francisco or L.A., and routing the train into San Francisco through Pacheco instead of expanding a pre-existing rail corridor.[4]

The Mojave Desert diversion, which connects growing suburbs to Los Angeles, is intended to open new affordable housing to workers in L.A. Additionally, diverting the train's route through the Mojave Desert led to cheaper land acquisition but more difficult engineering challenges than other proposed routes. The diversion through the Central Valley added additional rail service for Bakersfield, Fresno, and Merced. This route increases ridership, provides jobs, and revitalizes the Central Valley's construction industries. It is projected that the inclusion of the Central Valley in the rail project will "generate approximately 203,000 job-years of employment and $37.9 billion in total economic activity," for a region that has lagged behind the rest of the state in economic development.[5] It is also expected to relieve housing pressures in urban areas by making lower cost housing in the Central Valley more accessible to urban workers[6] and reducing travel times between Merced and Bakersfield by more than 90 minutes. It is important to note that expanding the route of the rail project also increased costs and delayed the completion of the project, with the Central Valley implementation expected to cost $20.4 billion.[7]

Beginning construction in the Central Valley provided some benefits such as construction jobs for the Central Valley, and the opportunity to test equipment and contractors in the easier open farmland construction sites as opposed to congested urban areas. However, the decision to begin in the Central Valley means that the rail project cannot open in the highest ridership areas (San Francisco and Los Angeles) early on in the process.[8] Even so, early interim ridership in the Central Valley is projected to save the state over $20 million annually by reducing operation costs of existing transportation infrastructure such as the Altamont Corridor Express commuter rail and Amtrak San Joaquin.[9]

The route into San Francisco was another debated political decision. Expanding the existing rail corridor near Livermore was projected to have higher ridership demand and lower environmental impacts, but San Jose and business interests in Silicon Valley argued that routing the train through San Jose would have significant economic benefits, including making lower-cost housing in the Central Valley accessible to tech employees. They successfully lobbied for the train to enter San Francisco across Pacheco Pass, which was both more expensive and a greater engineering challenge due to earthquake safety concerns for tunnel portions of the route.[10]

Political compromise is a part of democracy, and obviously local governments are convinced that there will be major economic benefits of being included in rail service or they wouldn't be striving to have their constituencies added to routes. It can be debated whether these particular decisions were the most effective way to run the project. Overall, the decisions discussed above have increased the number of riders and connected additional regions to the rail project. However, as the scope of the rail project has expanded, delays have mounted and costs have increased.

INDUSTRIAL POLICY ANALYSIS

California's high-speed rail project is a major transportation infrastructure investment, which are generally considered

[4] Vartabedian, "How California's Bullet Train Went Off the Rails." 2022.

[5] KPMG. "California High-Speed Rail Merced to Bakersfield Business Case Study." February 2020. Retrieved from: https://hsr.ca.gov/wp-content/uploads/docs/about/business_plans/2020_Business_Plan_Business_Case_Assessment_Study.pdf.

[6] California High Speed Rail Authority. "Northern California." 2024. Retrieved from: https://hsr.ca.gov/high-speed-rail-in-california/northern-california/.

[7] KPMG. "California High-Speed Rail Merced to Bakersfield Business Case Study." 2020.

[8] Vartabedian, "How California's Bullet Train Went Off the Rails." 2022.

[9] KPMG. "California High-Speed Rail Merced to Bakersfield Business Case Study." 2020.

[10] Vartabedian, "How California's Bullet Train Went Off the Rails." 2022.

public goods. Proposed benefits of this project include connecting different regions of the state in order to create jobs, promote economic development, reduce traffic congestion, and open new lower-cost housing for commuting workers. Additionally, because high-speed rail will be a zero-emission mass transit option once it's up and running,[11] and since it will provide a lower-cost alternative to SFO-LAX flights (the busiest domestic air route in the country),[12] it is also projected to have large environmental benefits.

The project's challenges have centered around delays and rising costs, which have already been highlighted. These challenges seem to support efficiency concerns that are often raised by critics of government-led industrial policy-related projects. Because of these challenges and since the project is still ongoing, many questions remain including:

- **Could the private sector have completed this project more efficiently? Would the project have been attempted at all without public investment?** It is difficult to prove a counterfactual, but it seems unlikely that the private sector would have invested in a project this expensive and on such a large scale as it a public good, constraining potential return on investment. Additionally, as many of the delays and rising costs have been linked to the expansion of the project, it seems that a quicker and more cost-efficient version of this project would have ended up much more limited in scope. Proposed routes were expanded to include more riders and communities in the benefits of the project, and these political compromises also facilitated right-of-way land acquisitions, environmental permissions from local and regional authorities, and the satisfaction of federal funding requirements.[13]
- **Are there more efficient ways to achieve similar benefits to those that are predicted to come from high-speed rail connectivity? What will the ultimate impacts of this project be?** Again, since the project is still ongoing, it is difficult to draw conclusions about its long-term effects. The high-speed rail project will have the capacity to move 7,500 people per hour in each direction when completed. To create a comparable transportation capacity through either highway or air travel infrastructure would cost an estimated $153-199 billion, nearly double the costs of the rail project.[14]

The other remaining question is: should California's high-speed rail project be considered industrial policy? Many consider transportation infrastructure separately from industrial policy unless it is explicitly intended to benefit a particular industry.[15] The overall goals of the project are focused around job creation, connectivity and economic development. Particular industries are not cited in the rationale of the project.[16] However, several of the decisions about routes and the implementation of the project relate to specific regions and industries, which suggests that this project may indeed be industrial policy even if it wasn't advertised as such. For example, the decision to route the train's entrance into San Francisco through San Jose was explicitly intended to reduce housing costs and make workers available to Silicon Valley tech businesses. Similarly, the inclusion of the Central Valley route was specifically intended to strengthen the construction industry in the region and has included additional industrial policy

[11] California High Speed Rail Authority. "About California High Speed Rail." 2024.
[12] California High Speed Rail Authority. "Northern California." 2024.
[13] California High Speed Rail Authority. "High Speed Rail at a Glance: Connecting California, Expanding the Economy and Transforming Travel." 2024. Retrieved from: https://hsr.ca.gov/high-speed-rail-in-california/statewide/.
[14] California High Speed Rail Authority. "High Speed Rail at a Glance." 2024.
[15] Rodrik et al. 2023, p. 5.
[16] California High Speed Rail Authority. "About California High Speed Rail." 2024.

components such as collaboration with industry groups and the development of job training centers.[17]

DARPA

The Defense Advanced Research Projects Agency (DARPA) was established under the Department of Defense during the Cold War to focus on long-time horizon research and ensure that the U.S. would not fall behind the USSR in scientific and technological advancement.[18] DARPA was based on the 1950s ARPA model, where the Pentagon collaborated with NASA and the Atomic Energy Commission in order to develop advancements in computing and other important technology sectors.[19]

DARPA's mission prioritizes transformational change with a focus on military applications by making "pivotal investments in breakthrough technologies for national security."[20] While their work centers around funding basic scientific research and early technological innovation, DARPA also strives to facilitate the commercialization of successful research investments and to promote coordination and communication between the private sector, academia, and government stakeholders. DARPA is a supply side intervention that provides information and brokerage support to academic and private sector R&D efforts. This includes both direct support for innovation but also builds communication networks between private sector, academia, and government actors to facilitate collaboration and commercialization of research.[21]

DARPA'S IMPACT

DARPA provides funding for both basic and applied research. Basic research is exploratory or speculative and often centers around advancing understanding. Applied research links basic research to practical ends, and commercialization takes that and develops a product that can be manufactured and sold. The private sector often avoids basic research, preferring to fund applied research and commercialization instead since these types of investments usually generate better profits at least in the short term.[22] As of 2021, 15% of DARPA's funding went to basic research, 40% to applied research, and 45% for advanced technology development.[23] DARPA remains committed to advancing basic research as part of their strategy for addressing social needs.

DARPA's R&D support produced major innovations including the internet, GPS, voice recognition, and advances in computing, semiconductors, and microchips. Other notable advances include developments in munitions, stealth and unmanned aircrafts, and space technologies. These innovations were intended to benefit the U.S. military, but they have also been central to driving growth in the private sector and opening new billion-dollar industries.[24]

THE DARPA MODEL: INSTITUTIONAL & MANAGEMENT STRUCTURES

In addition to its impressive track record of not only producing military innovations but also facilitating their transfer from the research phase to commercialized products, DARPA moves quickly with programs lasting approximately 3-5 years, and maintains a relatively small number of staff (220 government employees) and modest budget.[25] DARPA is also frequently lauded for its institutional and management structures. DARPA's management model, focus

[17] California High Speed Rail Authority. "Central Valley." 2024. Retrieved from: https://hsr.ca.gov/high-speed-rail-in-california/central-valley/.
[18] DARPA. "About DARPA" Retrieved from: https://www.darpa.mil/about-us/about-darpa.
[19] Mazzucato, M. *The Entrepreneurial State: Debunking Public vs. Private Sector Myths.* 2013. Public Affairs. p. 82.
[20] DARPA. "About DARPA" Retrieved from: https://www.darpa.mil/about-us/about-darpa.
[21] Mazzucato, 2013. p. 80-89.
[22] Dugan, R. & Gabriel, K. *"Special Forces" Innovation: How DARPA Attacks Problems.* October 2013. Harvard Business Review. Retrieved from: https://hbr.org/2013/10/special-forces-innovation-how-darpa-attacks-problems.
[23] Congressional Research Service. *Defense Advanced Research Projects Agency: Overview and Issues for Congress.* August 19, 2021. Congressional Research Service. Retrieved from: https://sgp.fas.org/crs/natsec/R45088.pdf.
[24] Dugan & Gabriel, 2013.
[25] DARPA. "About DARPA" Retrieved from: https://www.darpa.mil/about-us/about-darpa.

on long time horizons, and emphasis on communication and collaboration have all been key to its successes.

Firstly, DARPA's management model relies on recruiting world class researchers and experts in relevant fields to serve as program managers. These managers work together with experts from academia and the private sector on short, high-intensity projects. Since the problems DARPA chooses to focus on are so challenging that they "cannot be solved without pushing or catalyzing the science," they tend to inspire dedication and high levels of collaboration.[26]

DARPA's program managers have a high level of autonomy in selecting promising R&D investments and in cutting losing investments. Project managers select projects that both open new possibilities created by scientific advances focus on solving long-standing problems. Additionally, since many of DARPA's projects focus on basic research,

> "…they involve fast iterations. Planning should be light and nimble. Progress can be assessed by tracking iterations to see if they are converging on goals, revealing dead ends, uncovering new applications, or identifying the need for unforeseen scientific advances.
>
> Insisting that a team steadily hit milestones established in initial plans can cause it to adhere to a path that—based on something the team has learned—no longer makes sense. Sometimes a setback or a failure is the most effective tool for discovery. If people working on a particular piece of a project experience a failure, it's often because something they encountered surprised them. That's to be expected in high-risk projects. When such events occur, the project leader has to let the team members press forward as long as they can see that the approach might ultimately work within project constraints, even if they deviate from the original course."[27]

DARPA's institutional culture includes a high tolerance for failure, which enables risk-taking and allows managers to cut losing investments without fear of losing their jobs or funding. This ensures that DARPA can pull funding from failing projects and reallocate it to more promising endeavors which improves the agency's efficiency.[28]

Secondly, when considering which technologies to invest in, DARPA prioritizes decision-making with long time horizons in mind. Part of this process is considering their work as a large investment portfolio, and balancing risk, success, and phases of research investment across the agency. Long-term decision-making is also central to DARPA's goals in selecting projects and their overall operations. As part of their strategy to addressing social needs, DARPA is committed to advancing basic research. Basic research is exploratory or speculative and often centers around advancing understanding while applied research links basic research to practical ends; commercialization then develops a product that can be manufactured and sold.

Thirdly, DARPA prioritizes communication and collaboration. Close communication with partners makes it easier for managers to catch failing investments earlier in the process. Ease of communication between researchers and government stakeholders also helps DARPA adapt to changing circumstances. In addition to prioritizing communication between DARPA and recipients of funding, DARPA fosters information sharing and communication between academic and private sector researchers as well as other government stakeholders and private sector venture capitalists to create an environment that promotes

[26] Dugan & Gabriel, 2013.
[27] Dugan & Gabriel, 2013.
[28] Congressional Research Service, 2021. p. 6.

information spillovers, collaboration, and innovation more broadly. This environment also makes it easier for the private sector to further develop scientific advancements and innovations coming out of DARPA and take them to market. DARPA is commonly regarded as one of the most successful examples of industrial policy and a model that many have tried to replicate.

INDUSTRIAL POLICY ANALYSIS

DARPA is a government intervention in the economy that is intended to drive innovation with the goals of national defense, strategic autonomy, and international competition. Generally, national security is considered an important externality that is the role of the public sector. Additionally, DARPA's role in promoting basic research and early-development technologies supports R&D that often lacks funding from the private sector. Overall, the government's focus on national security, the broad scope of their interest, long-time horizon thinking, and their large purchasing power has enabled DARPA to seek out early-development technologies and create a demand for their development. DARPA has successfully produced technological and scientific advances for security purposes such as improvements in stealth technologies and unmanned aircrafts. DARPA has also generated innovations like the internet, GPS, and semiconductor improvements that began as military-focused projects and were later commercialized by the private sector.[29]

Solyndra

In 2009, the Obama administration introduced the American Recovery and Reinvestment Act (ARRA), which included loan guarantees, tax incentives, and subsidies for research and investment. ARRA's goals included creating jobs and promoting economic recovery after the 2008 recession through investment in science and health technologies, transportation, environmental protection, and other infrastructure. Through ARRA, Department of Energy (DOE) funding was made available to increase energy efficiency and reliability, reduce energy costs, reduce reliance on energy imports, and reduce the environmental impacts of energy production.[30] Solar-panel startup Solyndra was selected as a pioneer case to highlight the objectives and impacts of ARRA and the administration's broader efforts towards clean energy goals.

In 2009, Solyndra received $535 million in federal loan guarantees from ARRA and a $25 million tax break from California,[31] and, in 2010, the company raised $450 million from private investors.[32] In 2011, Solyndra declared bankruptcy and defaulted on the ARRA loan. Outrage over the amount of taxpayer money expended on a failed venture and political concerns about the influence of corporate lobbying led to an investigation by the Department of Justice and the Office of the Inspector General into the commercial viability of Solyndra's technology and whether Solyndra had been financed because of political influence within the DOE.[33]

To understand what Solyndra can teach us about industrial policy, this case study examines the factors behind Solyndra's collapse, issues within the design and implementation of ARRA, and a broader analysis of how this case fits into our understanding of what factors are most important to an industrial policy's success or failure.

[29] Dugan & Gabriel, 2013.

[30] National Energy Technology Laboratory. "Financial Assistance Funding Opportunity Announcement: State Energy Program Formula Grants." U.S. Department of Energy. April 24, 2009. Retrieved from: https://www1.eere.energy.gov/wip/pdfs/sep_arra_foa.pdf.

[31] Forbes 2021.

[32] Rodrik, D. "Green industrial policy." *Oxford Review of Economic Policy.* Vol 30, 3. 2014. (p. 469-491). Retrieved from: https://drodrik.scholar.harvard.edu/files/dani-rodrik/files/green_industrial_policy.pdf.

[33] Rodrik, "Green industrial policy." 2014, p. 478.

SOLYNDRA'S FAILURE

Solyndra was a start-up that focused on producing photovoltaic cells for solar panels. In contrast to the industry standard at the time, Solyndra used copper indium gallium selenide (CIGS) as a semiconductor material instead of silicon. CIGS was less efficient at converting solar energy than silicon but was cheaper. At the time Solyndra was founded, silicon prices were rising quickly, and the company's business model depended on silicon prices remaining high. In early 2008, China built up new production capacity, which caused silicon prices to drop drastically and made silicon cells much cheaper than Solyndra's CIGS cells. In addition to the expansion of domestic silicon production, Chinese expansion of photovoltaic cell production increased the global capacity 600% between 2007 and 2010.[34] These changes, which relate back to Chinese industrial policies, all contributed to Solyndra's failure.

It is important to reemphasize that many of the factors that led to Solyndra's failure were market changes caused by China's industrial policy.[35] It could be argued that Solyndra's failure was in part a clash between American and Chinese industrial policies, and that in this case China won the global solar market because it was willing to invest more in protecting and promoting its domestic solar production and related sectors than the U.S. Though competition with China was not one of the stated goals in the formulation of ARRA, it is apparent that this competition heavily influenced the outcomes of the policy.

ISSUES WITHIN ARRA

While Solyndra's collapse was driven largely by financial factors and the industry-wide effects of China's industrial policies, Solyndra was an industrial policy failure on its own merits and was shaped by several key aspects of ARRA's structure and implementation. These aspects include a lack of metrics and mechanisms for cutting failing projects, a large number of policy objectives and uncertainty about how to prioritize them, and political pressure around Solyndra's success.

While failure is part of even successful industrial policy efforts, it is important to create systems which let losing investments go in order to minimize losses. Monitoring and evaluation of the recipient firms, clear metrics for success and benchmarks over time, as well as explicit mechanisms to handle failing projects are all essential to ensure that funds are used efficiently and to minimize losses when projects fail. ARRA did not create clear metrics for evaluating the performance of firms beyond recouping loan guarantees. Additionally, it did not consider the possibility of firms failing, or create processes to catch failing projects early.

ARRA's objectives were uncertain and contained a long list of goals including: creating jobs, promoting economic recovery, spurring investment in infrastructure, and encouraging environmental protection.[36] These goals were not always complementary, and the program did not create guidelines for how to prioritize these distinct objectives when they clashed.

Another factor that shaped issues surrounding Solyndra was the lack of measures to protect the program from political pressures. Solyndra was selected as an early showcase for the Obama administration's clean energy goals. The administration's vocal support in the press invited scrutiny and criticism from political opponents. Publicly championing Solyndra as a specific firm, instead of the overall ARRA program or even just emphasizing a clean energy policy priority more broadly, was likely a mistake.

[34] Rodrik, 2014, p. 477.
[35] Rodrik, 2014, p. 477.
[36] National Energy Technology Laboratory. "Financial Assistance Funding Opportunity Announcement: State Energy Program Formula Grants." 2009.

In addition to drawing opposition, the public investment of political capital into Solyndra also made cutting support to the project politically difficult even after it was clear that the firm would not succeed. This political pressure also led to the approval process for Solyndra's funding to be rushed, even though silicon prices had already begun dropping before their loan guarantee was approved.[37]

At the time of Solyndra's collapse, there was some concern that the political pressure from the Obama administration was linked to Solyndra's lobbying influence; the company spent approximately $1.9 million on lobbying between 2008 and 2011.[38] This is on the high side for comparable early-stage firms but is consistent with ordinary levels for the energy industry. While federal investigators concluded that the approval for Solyndra's loan had been mismanaged, they did not prove that lobbying or other political incentives had caused the mismanagement. Measures such as clearer and more limited program objectives and the separation of the program from political messaging could have helped mitigate the risk of political pressures distorting the funding selection and approval processes.[39]

INDUSTRIAL POLICY ANALYSIS

ARRA's justification was based on common industrial policy goals including: addressing a crisis quickly (here including both the 2008 economic crisis and environmental goals related to climate change) as well as promoting job creation and growth.[40] Additionally, the federal loan guarantee and state tax break that Solyndra received were clearly intended to benefit the clean energy industry, meaning that ARRA, including the support Solyndra received, should be classified as industrial policy.

The main argument for justifying government intervention around clean energy technologies is that the market is not pricing the negative externalities of environmental damages into energy, which makes it difficult for clean energy technologies (including solar companies) to compete with more established energy sectors like oil and gas. In this case, the government intervened to correct a perceived market failure.[41] It is important to note that economists disagree about whether support for particular firms or sectors is the best way to address this externality, with some arguing in favor of a carbon tax instead. In line with considerations of carbon pricing externalities, it is unlikely that investment in solar and other clean energy technologies would have advanced at scale without some kind of government intervention.

Solyndra's case demonstrates several common concerns from critics of industrial policy including the risks of lobbying, rent seeking, and regulatory capture as well as concerns that the government does not have enough information or expertise to "pick winners."[42] However, Solyndra's case doesn't give us the full story of ARRA. While Solyndra was clearly a failed investment, ARRA did produce some successes. For example, Tesla received a $465 million loan guarantee and ended up becoming so successful that they paid their loan back 9 years early.

Though it's beyond the scope of this case study, it makes more sense to evaluate the overall success of the collective portfolio instead of the success or failure of individual

[37] Andrzejewski, A. "Remembering 'Solyndra'—How many $570 million green energy failures are hidden inside Biden's infrastructure proposal." *Forbes*. April 12, 2021. Retrieved from: https://www.forbes.com/sites/adamandrzejewski/2021/04/12/remembering-solyndra--how-many-570m-green-energy-failures-are-hidden-inside-bidens-instructure-proposal/.

[38] McArdle, J. "Solyndra spends liberally to woo lawmakers until the end, records show." *NYTimes*. September 2011. Retrieved from: https://archive.nytimes.com/www.nytimes.com/gwire/2011/09/16/16greenwire-solyndra-spent-liberally-to-woo-lawmakers-unti-81006.html?pagewanted=all.

[39] Rodrik, 2014, p. 482.

[40] Criscuolo et al. 2022, p. 16.

[41] Galston, W. "Slow down on the Solyndra criticism! Of course government can foster innovation." Brookings. September 2011. Retrieved from: https://www.brookings.edu/articles/slow-down-on-the-solyndra-criticism-of-course-government-can-foster-innovation/.

[42] Rodrik et al., 2023, p. 6.

investments, as one would with an investment fund or venture capital portfolio. A program with no failure indicates that the program is not taking enough risk to maximize benefits, especially when focusing on innovative and early-development technologies. In this vein, the end goal is not to avoid all failure, but to have the impacts of the success outweigh and cover the costs of failed investments. Economists note that it remains unclear whether ARRA's loan guarantee program performed well as a whole.[43]

When considering the success of an industrial policy, it is also essential to note that there may be cases where the importance of the policy goal (e.g. national security or, in the case of ARRA, environmental concerns) supersedes short-term financial profits. In other cases, a policy may generate externalities that provide benefits to society and/or the government that are not captured when considering the success or failure of individual firms. For example, despite Solyndra's failure, some of the other firms that received ARRA investments produced considerable long-term cost savings for the U.S. through improvements in energy efficiency.[44] In some cases, externalities or political goals like keeping up with China-backed competitors may shift considerations of the success of an industrial policy. In other cases, the benefits generated by an industrial policy may not justify the costs of implementing the program. Regardless, Solyndra and ARRA are important reminders that though designing successful industrial policy is difficult, it must contain measures and incentives that give appropriate weight to market forces considering inevitable political pressures.

[43] Rodrik, 2014, p. 478–483.
[44] Rodrik, 2014, p. 478.

Reactions: Betsey Stevenson and Michael Strain

Two economists—Betsey Stevenson (University of Michigan) and Michael Strain (American Enterprise Institute)—share their views on the current state of democratic capitalism and the effectiveness of industrial policy in the United States.

The Resilient and Growing Economy That Americans Hate

AN ESSAY BY BETSEY STEVENSON (NOVEMBER 2024)

The U.S. economy ended 2024 with a strong performance, growing by a projected 2.8%—well ahead of the 1.8% growth projected for other advanced economies. This marks another year of exceeding expectations, as fears of a recession that peaked in October 2022 gradually faded. Back then, the Federal Open Market Committee predicted modest growth of 0.2% in 2022, 1.2% in 2023, and 1.7% in 2024. Instead, the economy outperformed, growing 2.5% in 2022, 2.9% in 2023, and maintaining a robust 2.8% annual rate in the third quarter of 2024. Looking ahead, the Fed has revised its projections for 2025 through 2027, anticipating 2.0% growth before settling back to the longer-term trend of 1.8%. The International Monetary Fund (IMF) has also increased its forecast for U.S. economic growth, placing the U.S. at the forefront of the Group of Seven (G7) advanced economies. The economy is bigger today than forecasters such as the Congressional Budget Office predicted even prior to the pandemic.[1]

Quarter after quarter, the U.S. economy continues to surpass expectations, defying earlier predictions of a slowdown, generating wide-spread increases in living standards. The sources of growth come from both businesses and consumers, whose investment and spending has also defied expectation. New business formation has remained at highs last seen before the great recession and an increase in foreign born labor has ensured that workers are available to take job opportunities, even as native-born American workers are employed at near record rates.

While many feared that a recession was necessary to reduce inflation, the battle against inflation around the globe has largely occurred through economic expansion. High productivity and labor force participation has helped the U.S. economy remain resilient and brought inflation down to around 2.5%, not quite to the Federal Reserve's target but a remarkable reduction during a period of rapid growth. Demand remained high and supply was able to increase quickly enough to slow the rate of price increases. In the United States both labor productivity and employment rates have increased to spur growth in output. Employment of prime age (ages 25 to 54) people rose to nearly 81%, reflecting low unemployment and high labor force participation. This is close to the all-time high of prime-age employment achieved in April 2000. High economic growth and high productivity growth reflects the U.S.'s unique ability to translate investment into higher productivity and wages, outperforming many global peers. These gains are underpinned by strategic investment, innovation, and a dynamic labor market, positioning the U.S. at the end of 2024 as a global economic leader.

And yet, the United States, indeed the entire global economy, faces a confluence of challenges stemming from both immediate crises and persistent structural issues. Geopolitical conflicts, such as Russia's invasion of Ukraine, have disrupted supply chains and driven inflationary pressures, particularly in energy and food markets. Climate-related disruptions, including extreme weather events, further strain resources and economic

[1] https://www.crfb.org/papers/analysis-cbos-budget-and-economic-outlook-january-2020.

stability. Simultaneously, the global economy is navigating the aftermath of synchronized monetary tightening aimed at curbing inflation, which has led to elevated borrowing costs and financial market volatility, particularly in emerging markets with high external financing needs. Structural challenges, such as aging populations, rising government debt, weak productivity growth in many countries, and the rise of geoeconomic fragmentation, threaten potential long-term global economic growth.

But perhaps the most immediate challenge is simply the American public's dissatisfaction with the overall economy. Despite the remarkable growth and resilience amidst global economic challenges, employment and income growth have not been enough to convince Americans that their economy is strong. Consumer sentiment has been lackluster, even though consumers continue to spend. Many have speculated that frustration is simply about the price level: even with inflation back to historically normal rates, the price level remains elevated and Americans are still getting used to living at this new, higher level of prices. Inflation peaked at 9.1% in June 2022 and within a year had fallen to 3%, however the brief period of high inflation has sparked economic anger and frustration. With all the global challenges on the horizon, there are real, dramatic risks to the U.S. economy, and our years of pessimism presents an additional risk: Have we been crying wolf for so long that we will fail to see the actual wolf at the door?

This lack of trust and confidence in the U.S. economy and government institutions presents a barrier to addressing long-term structural challenges to the U.S. economy. Congress and the President can help shape the future of the U.S. economy through trade, investment, and immigration policy, but these policies are often politically difficult. Moreover, the public policies most effective at shaping the future of the U.S. economy take years to bear notable fruit. Politicians face the difficult conundrum of being held most accountable for the cyclical aspects of the economy even though they have little control over the cyclical aspects. And yet, they have the most control over building its long-term potential growth and often face too little incentive to do so effectively.

SHIFTING TOWARD STRATEGIC INDUSTRIAL POLICY

The United States, along with other advanced economies, has in recent years pivoted toward industrial policy designed to address critical challenges and opportunities. The approach the United States has taken emphasizes strengthening the nation's industrial base, investing in advanced manufacturing, and enhancing competitiveness in key sectors such as clean energy, semiconductors, and technology. Such policies aim to reduce reliance on international supply chains while fostering domestic innovation and creating high-quality jobs.

Increased public and private investment has bolstered economic output and contributed to productivity gains. Furthermore, these policies align with broader goals of economic security and resilience, ensuring that the U.S. remains competitive on the global stage. By prioritizing long-term investment over short-term gains, the U.S. is laying the groundwork for sustained economic growth and innovation.

However, the adoption of industrial policy is not without potential pitfalls. There is a significant risk of misallocated resources, as government intervention may inadvertently favor politically connected industries or projects with limited economic viability. This can lead to inefficiencies and hinder the broader market's ability to allocate resources effectively. Furthermore, excessive reliance on government-led initiatives risks crowding out private sector innovation, stifling

competition, and creating complacency among industries shielded from market pressures.

Capitalism—a thriving, competitive marketplace of ideas and goods and services—is at the heart of historical gains in living standards. And yet governments around the globe respond to the siren song of existing business owners who urge government policy that ultimately raises their profits by stifling competition. In doing so, industrial policy can ultimately limit an economy's potential.

One way in which such policies limit the economic potential of a country is through protectionism. The forces that urge for industrial policies also lead to populist calls for limiting trade. By straining international trade relationships and provoking retaliatory measures from key trading partners, populist calls for protectionism could disrupt global supply chains and lead to higher costs for consumers and businesses alike.

However, this does not mean that there is no role for government in economic development. The two key roles are in creating the right environment for competition to thrive and spending in areas with positive spillovers such as research and infrastructure. There are many areas of investment in which the private sector simply cannot capture the full return. In a classic example of a positive externality—research generates benefits that flow beyond the original funder leading any given funder to spend too little on research.

INCENTIVES, CAPITALISM, AND THE ROLE OF INDUSTRIAL POLICY

A well-functioning economy hinges on a delicate balance: allowing individuals to pursue their self-interest while ensuring that this pursuit aligns with broader societal goals. Industrial policy must recognize this reality, leveraging the strengths of capitalism while addressing its inherent constraints.

At its core, capitalism thrives on incentives. People and businesses are motivated to innovate, compete, and succeed, often improving productivity and creating wealth in the process. However, without appropriate rules and norms, these same incentives can lead to undesirable outcomes, such as monopolistic behavior, exploitation, or rent-seeking practices. Industrial policy must carefully design systems that encourage innovation and competition while deterring harmful behaviors.

The effectiveness of these policies depends on creating and maintaining constraints that guide economic actors toward outcomes beneficial for society. These constraints include laws that enforce fair competition, norms that discourage exploitative practices, and policies that ensure equitable access to opportunities. For instance, industrial policy can address barriers like inadequate education or skill mismatches that prevent individuals from fully participating in emerging industries. By ensuring a level playing field, industrial policy reinforces trust in the system—a critical factor in fostering cooperation and economic progress.

Critics often point to capitalism itself as the source of social and economic ills. However, the issue is not the pursuit of self-interest but the decay of the rules and norms that govern it. When rules are weakened or unenforced, incentives can lead to behaviors that harm the economy and society. This is where industrial policy can play a corrective role, recalibrating the system to ensure that self-interest aligns with collective well-being.

Ultimately, a strong industrial policy is not about curbing capitalism but about reinforcing the structures that make capitalism work. By addressing systemic barriers, maintaining trust in institutions, and creating fair opportunities for all, such policies can harness the power of individual ambition to build a more inclusive and resilient economy.

LABOR MARKET AND WORKFORCE DEVELOPMENT

Industrial policy is uniquely positioned to tackle persistent challenges in the labor market by creating pathways for broader participation and aligning workforce skills with the demands of emerging industries. As governments and private sectors invest in critical areas like clean energy, advanced manufacturing, and digital infrastructure, these efforts generate significant opportunities for workforce expansion and transformation. However, realizing the full potential of these investments requires addressing key gaps in labor force participation and resolving skills mismatches that could limit economic growth.

One of the foundational elements of this strategy is education and workforce training. The rapid pace of technological advancement demands that we evolve our educational system to better train potential workers through the use of dynamic, skills-oriented training programs. To be sure, critical thinking skills are the most in-demand and needed skills. Human judgment is necessary to make decisions, innovate, and care for others. But our education system as it currently stands is not working well for everyone.

Most notably, American boys and men are struggling with a rules-based-teach-to-the-test learning environment that leads to girls being nearly 50% more likely to go to college right out of high school. In the short-term collaborations between policymakers, businesses, and educational institutions can design programs that anticipate the likely future needs of industries. For example, partnerships with community colleges and trade schools can produce tailored certifications and technical training for jobs in renewable energy or semiconductor manufacturing. Similarly, apprenticeships and on-the-job training programs can offer a practical bridge for workers transitioning into new fields.

But long-run change requires a deeper dive into understanding the skills that we should be fostering in the next generation and the best way to help foster those skills.

Industrial policy also seeks to bring traditionally underserved populations into the fold, addressing systemic inequities in labor market access. Efforts to upskill and reskill workers displaced by automation or globalization are crucial in this regard. Programs targeting lower-skilled workers can focus on foundational technical skills, enabling them to participate in high-growth sectors. For example, structured pathways into green energy jobs could benefit workers from industries like coal or oil, where employment opportunities are in decline.

Beyond skills, structural barriers to workforce participation must also be addressed. For women, single parents, and minority workers, challenges like the lack of affordable childcare, reliable transportation, or flexible work arrangements can impede participation in the labor market. Industrial policy can incorporate funding for supportive infrastructure—such as subsidized childcare services or expanded public transit networks—making it easier for these populations to engage with new opportunities.

Equity-focused industrial policy doesn't just benefit individuals—it strengthens the economy by broadening the pool of skilled labor, reducing income disparities, and driving innovation through diverse perspectives. By embedding inclusivity into its framework, industrial policy can turn economic transitions into opportunities for all, ensuring the workforce is not only ready for emerging industries but also reflective of the broader society it serves.

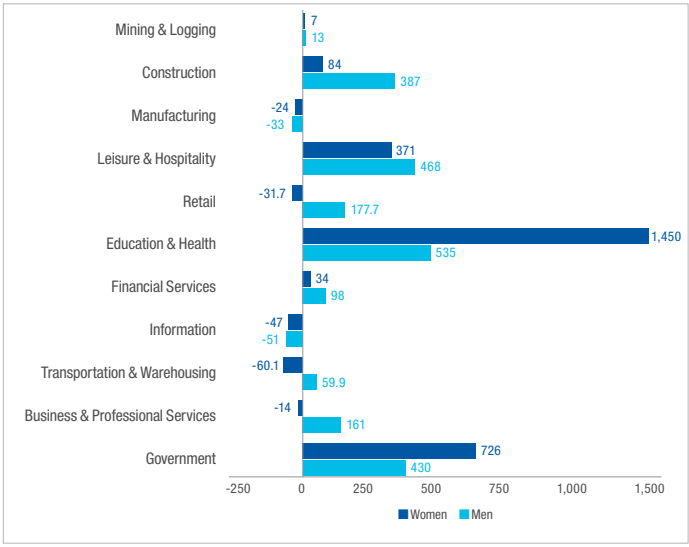
THE CURRENT STATE OF JOB GROWTH AND THE LABOR MARKET

Over the past two years, women have primarily gained jobs in education and health care services, leisure and hospitality,

and government. Those have also been the top three industries for job growth among men. These sectors traditionally rely on labor-intensive roles and human interaction, which are less directly tied to the capital-intensive industries emphasized by industrial policy. Yet, their growth highlights how industrial policy and service-driven sectors can coexist and support each other in a dynamic economy. More sharply: these three industries provide the social infrastructure necessary for industrial policy to succeed, such as a healthy, well-educated workforce and stable communities.

Figure 1: Industry Employment Growth by Gender

Net Job Growth Between October 2022 and October 2024, in Thousands, Seasonally Adjusted



Source: U.S. Bureau of Labor Statistics. Created with Datawrapper.

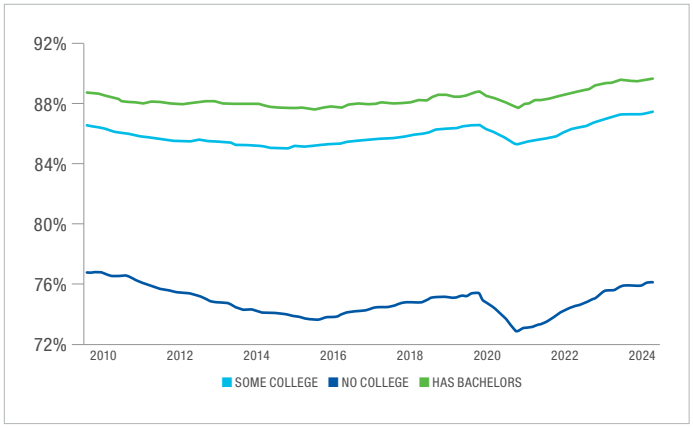
These sectors were also the last to recover following the pandemic and their recovery reflects the ongoing strength of the U.S. economy.

Labor force participation has recovered most strongly among prime age adults—those ages 25 to 54 (see Figure 1). A larger share of the prime age population is participating in the labor force and, with the low unemployment rate, a larger share are employed today than in 2019. However, when this is broken down by education as in the figure below, the yawning gap between the participation rate of those who attend at least some college and those who attend none is made clear. For those without any college education, the labor force participation rate has recovered to its pre-COVID level, but it has yet to recover to it's peak around the 2008 recession. In contrast, more prime age college educated people—including those with some college or vocational training—are in the labor force today compared to 2010.

Industrial policy in the United States has aimed to increase employment in rural areas, and by that criteria it has succeeded. Labor force participation rates for both men and women have increased in rural areas. Men have made further gains in rural areas than in other parts of the United States, while women's labor force participation has grown more rapidly in larger metropolitan areas.

Figure 2: Prime Age Labor Force Participation, By Education

Percent of Individuals Ages 25-54, Who Are Working or Looking For Work

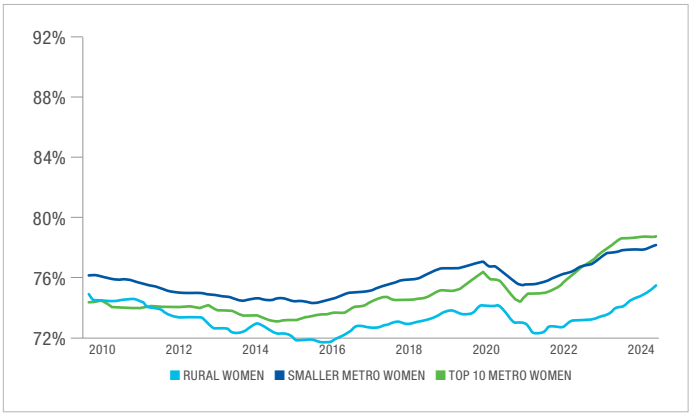


Seasonally unadjusted data, presented as a trailing 12 Month average. The "top 10" metros were selected based on their 2021 ACS-estimated population size. Micropolitan communities are included within the rural group.

Source: Ipmus CPS. Created with Datawrapper.

Figure 3: Prime Age Female Labor Force Participation, by Geography

Percent of Women Ages 25-54, Who Are Working or Looking for Work

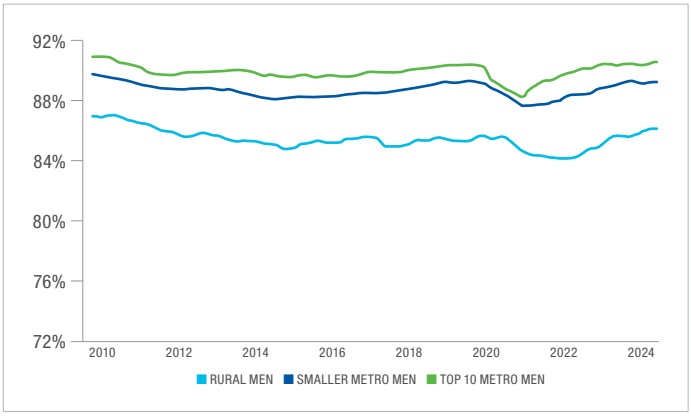


Seasonally unadjusted data, presented as a trailing 12 Month average. The "top 10" metros were selected based on their 2021 ACS-estimated population size. Micropolitan communities are included within the rural group.

Source: Ipmus CPS. Created with Datawrapper.

Figure 4: Prime Age Male Labor Force Participation, by Geography

Percent of Men Ages 25-54, Who Are Working or Looking for Work

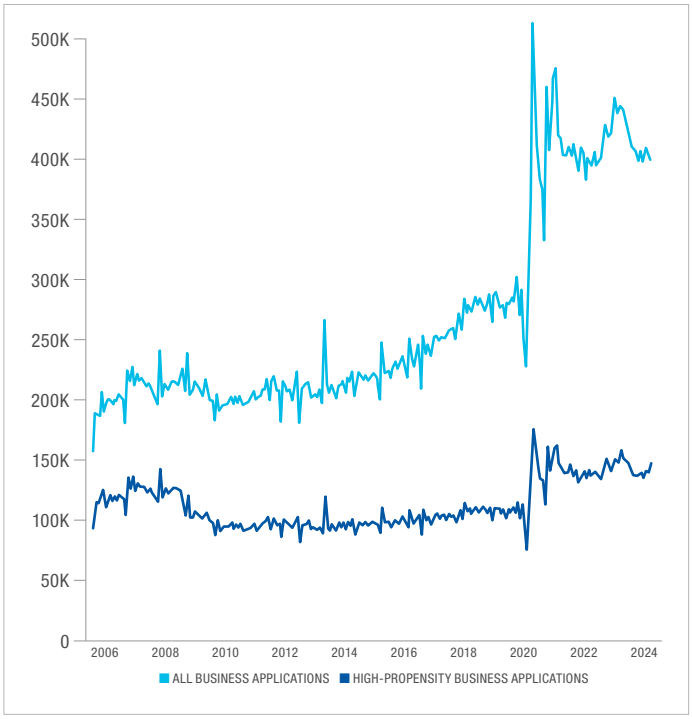


Seasonally unadjusted data, presented as a trailing 12 Month average. The "top 10" metros were selected based on their 2021 ACS-estimated population size. Micropolitan communities are included within the rural group.

Source: Ipmus CPS. Created with Datawrapper.

Figure 5: New Business Applications Over the Past Two Decades

Total and High-Propensity Business Applications for All NAICS, Seasonally Adjusted



High-propensity businesses are expected to have employees and payroll.

Source: U.S. Census Bureau. Created with Datawrapper.

Finally, as mentioned earlier, job growth has been spurred by the large increase in new business formation, as seen in the record high level of applications for new businesses, including those deemed "high propensity" businesses.

FAMILIES AND ECONOMIC GROWTH: A FOUNDATION FOR INDUSTRIAL POLICY

In my first essay in the inaugural Denny Center report, I highlighted the importance of families and caregiving, emphasizing how these elements are integral to inclusive economic growth. Then, as now, the solution to persistent issues like low labor force participation must involve investing more in our youngest citizens, including prioritizing and supporting caregiving work. Industrial policy must build on this insight by incorporating robust

support for caregiving infrastructure, such as childcare and eldercare, alongside investments in high-growth sectors like technology and manufacturing.

Affordable childcare and family-friendly workplace policies enable broader workforce participation, particularly among women, whose labor force recovery has often driven economic rebound. By addressing these foundational needs, industrial policy not only supports immediate economic goals but also invests in the long-term development of human capital. This approach ensures that economic opportunities extend to all families, creating a virtuous cycle of growth that benefits the entire society.

In my 2023 essay, I highlighted declining public trust in institutions as a significant barrier to economic and social cohesion, noting that "higher trust in institutions leads to greater investment and economic activity". This decline has fueled dissatisfaction with the economy, even amidst strong performance metrics like low unemployment and high labor force participation.

Industrial policy offers a path to rebuild trust by demonstrating government effectiveness through tangible, equitable outcomes. Investments in infrastructure, clean energy, and education can showcase the government's ability to act decisively and inclusively, fostering renewed public confidence. Transparent policymaking and active community engagement are essential to ensuring that these initiatives resonate with citizens and address their concerns about fairness and accountability.

These themes intersect powerfully in the context of industrial policy. Families are not just economic units but also the bedrock of societal trust. Policies that support families—whether through direct benefits or investments in community infrastructure—enhance trust by showing that institutions are responsive to everyday needs. For example, building childcare centers near industrial hubs ensures that families can participate in the opportunities created by industrial policy while feeling supported in their caregiving responsibilities.

Moreover, inclusive industrial policy that prioritizes equitable access to education, jobs, and training programs can reduce systemic inequalities that undermine trust. This alignment of economic goals with social priorities creates a stronger, more cohesive society where individuals and families feel both empowered and valued.

The integration of family-focused policies and trust-building initiatives into industrial policy is not just a moral imperative but also an economic strategy. By supporting families and rebuilding trust in institutions, industrial policy can create an economy that is both more competitive and more inclusive—an economy where growth is not just measured in GDP but also in the strength and well-being of the people it serves. This alignment of economic and social goals ensures that the U.S. remains resilient in the face of challenges and poised for sustainable progress.

CONCLUDING THOUGHTS

Last year, I concluded by stating that the explanation for the ongoing strong recovery must lie with supply. Industrial policy that focuses on strategic building of capacity can help foster the development of our economy's capacity. The key for government policy is to invest in the areas that the private sector is under incentivized to pursue on its own. But even more importantly, government policy must foster an open and competitive society.

At its heart, a successful industrial policy must align with the core principles of classic liberalism: openness to trade, ideas,

innovation, and people and the creation of a rule of law that is fair, impartial, and enforces the agreements that we make with each other. These principles not only drive economic dynamism but also reinforce the social contract envisioned by the philosopher John Rawls—a framework in which policies are designed to benefit the least advantaged while respecting fundamental freedoms and equality of opportunity.

Openness to people, trade, and ideas reflects a commitment to creating a society that values justice and mutual respect. For Rawls, justice as fairness requires not just formal equality but substantive opportunities for all to succeed. A liberal industrial policy honors this commitment by balancing market efficiency with social equity, creating structures that allow individuals to thrive regardless of their starting point.

By embedding the principles of liberalism within industrial policy, the U.S. can build a system that not only drives economic progress but also strengthens the social fabric. An economy open to trade, ideas, innovation, and immigration is not merely competitive—it is just, inclusive, and resilient. This approach fulfills the liberal promise of a society where all individuals, particularly the least advantaged, can flourish. In doing so, it secures not only economic prosperity but also the trust and cooperation essential for a vibrant democracy.

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Industrial Policy and Deficits: Dark Clouds for Democratic Capitalism

AN ESSAY BY MICHAEL STRAIN (OCTOBER 2024)

Democratic capitalism is a system that marries liberal democracy and free-market capitalism. This union creates tensions, and requires balancing competing aims. But this tension is healthy, not destructive—provided that democracy and capitalism are properly balanced, each sphere reinforces the other. Over the long term, capitalism requires liberal politics; and democracy will not maintain legitimacy without the prosperity that requires free markets.

Under democratic capitalism, the political system should interfere with markets as little as possible, only intervening for necessary regulation, to correct market externalities, and to raise revenue for public programs. Of course, market outcomes are not always socially desirable, as determined by citizens through the democratic process. Democratic capitalism allows for government to redistribute income and to provide services to adjust market outcomes. But, when the marriage is healthy, public policy must be conducted with the phrase "do no harm"—read "do as little harm as possible"—to the creativity, innovation, and dynamism that power long-term prosperity in mind.

And free markets must deliver the jobs, wage growth, and long-term prosperity that lead to widespread support for liberal democracy and the rule of law, and that allow for relative social cohesion and harmony.

With that in mind, what is the current state of democratic capitalism?

The economy is certainly holding up its part of the bargain:

- The average wage has never been higher. Throughout the labor market, average hourly earnings across all workers were $35.36 in September 2024, higher than it has ever been. For manufacturing production workers, construction workers, and non-supervisory workers in the service sector—roughly speaking, a group we can think of as workers who aren't managers—the average wage was $30.33. And after adjusting for inflation, wages for typical workers are also at record highs.
- Wages have been growing robustly for workers of all education levels.
- Median household income has never been higher. At $80,610 in 2023 (the most recent year for which data are available), nominal median household income more than doubled over the past 25 years. Because of the high rate of consumer price inflation of recent years—more on that topic in a moment—real median household income declined over the last few years. But in 2023, it resumed rising, and is within spitting distance of its 2019 high.
- Over eight in 10 adults between the ages of 25 and 54—roughly speaking, adults who are too old to be in school and too young to be retired—were employed in September. At 80.9 percent, the employment rate is higher than at any time since March 2001, shortly after the employment rate hit its peak of 81.9 percent in April 2000.

- Everyone who wants a job can get a job. The unemployment rate remains very low—well under the rate at which most economists and Federal Reserve policymakers believe is sustainable over the longer term.
- In today's labor market, businesses are chasing workers rather than workers chasing jobs. There are more job openings than unemployed workers.

As these indicators highlight, the strength of the economy is undeniable. This is all the more remarkable given the period of four-decade-high inflation the U.S. recently endured.

That inflationary episode can be understood through the lens of democratic capitalism as a failure of the political system to respect the proper functioning of the economy. The American Rescue Plan—the pandemic stimulus bill signed into law by President Biden in March 2021—stimulated the demand for goods and services well beyond the economy's productive capacity.

While the inflation of 2021-2023 had many causes, including shocks to the supply side of the economy, most of the surge in the rate of price increases came from excessive demand, fueled in large part by excessive fiscal stimulus—by politicians overweighting the (perceived) political benefits of stimulus programs and underweighting the risks they were imposing on the economy.

Due to this severe imbalance between aggregate demand and supply, the Federal Reserve had to increase the federal funds rate by over 4.5 percentage points in just one year, from near zero percent in March 2022 to 4.8 percent in March 2023. The Fed increased the rate all the way to 5.3 percent in the summer of 2023, and kept it at that high level until this fall.

Because the Fed's policy interest rate was so high, the interest rates on home mortgages, credit cards, and business loans all shot up. This created the widespread expectation that the economy would fall into recession in 2023. If that had happened, it would have been an even bigger failure of democratic capitalism—the story would have been that the political system did not have adequate respect for sound economic policy, and an increase in the unemployment rate was required to undo the damage.

It is a great thing that the economy avoided recession, but that should not absolve Congress and President Biden from the reckless fiscal policy they pursued in 2021. Economists—including me—were wrong about a recession in 2021 because of several developments that were difficult to forecast: A large surge in immigration kept the labor market cooler than it would have been, allowing the Fed to avoid even higher interest rates; the AI boom of 2023 sustained business investment and supported consumer spending in the face of high interest rates; and expectations of consumers and investors regarding future inflation remained remarkably well-anchored to the Fed's inflation target.

It would be imprudent for policymakers to bank on similar developments in the future. Instead, they should learn from the inflation of the early 2020s that in our system of democratic capitalism, irresponsible fiscal policy has real economic consequences.

It has political consequences, as well. Voters have been very concerned about inflation and have poorly rated President Biden's handling of the economy. President Biden's weak poll numbers on economic management have transferred to Vice President Harris. At the time of this writing, the election day is a month away. If the vice president loses to Donald Trump, part of the blame will go to irresponsible fiscal policy and the four-decade-high inflation to which it contributed.

INDUSTRIAL POLICY: (ALMOST) ALWAYS A BAD IDEA

A major threat to the health of democratic capitalism is the growing support for industrial policy in both political parties.

To be clear, industrial policy is not always bad, and is not something to be avoided in principle. In a recent paper for the Aspen Economic Strategy Group, I outline five criteria to help separate the industrial policy wheat from the chaff:

First, successful industrial policy has a clearly defined goal. Second, successful industrial policy should not attempt to balance multiple competing goals. Third, it should be a priori plausible that the policy will be achievable. Fourth, the policy should not be part of a partisan political agenda—it should have bipartisan support or be inherently nonpartisan. Finally, the broader ecosystem necessary for success—technological capability, workforce skills—should be in place before the policy is executed.

A recent example of successful industrial policy is Operation Warp Speed. Its goal was clear: the development, manufacture, and distribution of COVID-19 vaccines. It was not trying to achieve multiple, competing goals. When President Trump announced the program in May 2020, success was far from certain—but success was a plausible outcome. The development, manufacture, and distribution of COVID-19 vaccines was widely popular in both political parties. The U.S. had world-leading pharmaceutical companies—if any company was up to the job, they were. And the broader ecosystem was in place.

Operation Warp Speed was a huge success. Seven months after the program was announced, multiple new COVID-19 vaccines were authorized for use.

Operation Warp Speed was industrial policy: It was government intervention in the economy to override market outcomes with the goal of promoting a politically favored industry. But it was deployed responsibly. And the increase in GDP that resulted from the policy far outweighed its cost to the taxpayer. It paid off.

In passing the CHIPS and Science Act and Inflation Reduction Act (IRA), President Biden broke with the decades-old bipartisan consensus against industrial policy by using it to reshape the composition of industry and of employment in the economy. These laws—especially the IRA—are not targeted interventions in the economy to achieve well-defined, narrow outcomes. Instead, they have expansive goals: To revive domestic manufacturing employment, advance and increase the domestic clean energy sector, increase the "resilience," and advance the U.S.'s strategic competition with China.

The goals are far from clear. How will we know when we have revived domestic manufacturing? How will we know when we produce enough of the world's cutting-edge semiconductors to be sufficiently resilient? How will we know whether we have succeeded in slowing the pace of climate change? Importantly, what would constitute successfully passing a cost-benefit test for the taxpayer for any of these goals? What would constitute failure? And why?

The Biden administration's industrial policies are at odds with each other. With one hand, the administration is trying to advance the use of electric vehicles; with the other, it is using large tariffs to stop Americans from buying electric vehicles made in China. With one hand, the administration is trying to slow the pace of climate change; with the other hand, senior officials are trying to waive environmental regulations in order to accelerate the construction of semiconductor manufacturing facilities. The administration is spending taxpayer dollars on all these initiatives.

With respect to our third criteria, these policies are not plausibly achievable. The IRA will likely cost over $1 trillion, with CHIPS Act spending on top of that. It would be surprising if spending of this magnitude did not reallocate some jobs into manufacturing and away from other sectors. But they will not succeed in reviving domestic manufacturing in any meaningful sense. As I write in my AESG paper: "Even if these subsidies increased manufacturing employment by 50 percent—a huge increase—that would merely return the manufacturing employment share to its level from two decades ago, far from the golden era of manufacturing in the decades following the Second World War.

The IRA might succeed in catalyzing the development of clean energy technologies. But if it achieves this goal, we should be confident that it will be at much greater expense to the taxpayer, with much less economic efficiency, and with much greater damage to international alliances than a simple carbon tax or public funding for basic energy research. As for the CHIPS Act, allow me again to quote from my AESG paper:

> Given the importance of semiconductors to a wide variety of products and the large share of their production located in Taiwan, the CHIPS Act is much more defensible than the IRA. It is also expected to have a fiscal cost two orders of magnitude less than the IRA's. The CHIPS Act will likely see more semiconductor manufacturing in the US than would otherwise have been the case. But for resilience and national-security purposes, there is little reason to conclude that this activity needed to be moved to the United States at great expense to taxpayers.
>
> The U.S. produced 12 percent of the world's chips in 2020. A study commissioned by the Semiconductor Industry Association concludes that the CHIPS Act will lift this share to 14 percent in 2032. The study also finds that the U.S.'s production share of cutting-edge chips would rise from zero to 28 percent. Even if these optimistic forecasts come to pass, it is not clear whether these projected increases in U.S. production would materially advance either resilience or security. Is the U.S. qualitatively more resilient or secure if 72 percent, rather than 100 percent, of cutting-edge chips are produced in other nations?
>
> Instead of industrial policy, safeguarding national security should involve identifying a narrow set of specific inputs and goods that genuinely warrant special attention by the government, and working with allies to ensure that their supply is diversified away from adversarial nations or geopolitical hotspots. Coordinating with allies would allow production to be relocated to nations that are best situated to produce. It is a large leap from arguing that the supply of certain, select critical inputs and goods not be exposed to adversarial nations to arguing that their production should be located in the United States. Countering China with a coordinated coalition of allied trading partners would be much more productive than bursts of bilateral protectionism.

On the fourth criteria, the CHIPS Act has some bipartisan support, but the IRA does not. I am writing prior to the November election, but if President Trump wins it is likely that he will attempt to thwart the IRA, possibly even through legislative amendments. In that case, business plans would go up in smoke and the return on investment for the taxpayer would be even less.

Finally, companies receiving subsidies from these programs are running into serious challenges in effectively using them because the U.S. does not have a workforce trained to operate semiconductor factories. This, among several other factors, including those mentioned above, has led

to substantial delays. *A Financial Times* investigation this summer found that around 40 percent of the CHIPS Act and IRA projects worth more than $100 million had been substantially delayed or paused indefinitely.

During the U.S.'s current bout of industrial-policy enthusiasm, all the old questions are worth asking again: Why would the government be better at picking winners and losers than the market? If the government tries to shape the industrial and employment composition of the economy by overriding market forces, how will it avoid mission creep, corruption, and cronyism? The Biden administration has awarded $8.5 billion to Intel. Why does Intel need billions of dollars of taxpayer (read: other people's) money? Why is that a better use for taxpayer dollars then many other priorities?

Industrial policy is a threat to a healthy system of democratic capitalism for three reasons. First, in the marriage between liberal democracy and the free enterprise system, it is the role of markets to allocate resources and determine the composition of American industry and employment. When the government overrides markets, it slows economic growth and threatens long-term prosperity. By slowing productivity growth, wage growth, and the rate at which living standards rise, it also undermines support for liberal politics because democratic legitimacy stems in large part from strong economic performance.

Second, in a system of democratic capitalism, markets should determine the shape of the economy for a practical reason: market forces are better at that task than elected officials. When government substitutes political judgments for market forces, taxpayer dollars are used inefficiently. President Obama's 2009 effort to protect domestic tire manufacturers from competition with Chinese imports is a good example (of many). His policy protected around 1,200 jobs at a cost to American consumers of $900,000 per job in 2011.

This was an inadvisable policy because, in an economic sense, the $1.1 billion cost incurred by consumers could have been put to a higher use. It is an inadvisable policy in a political sense because it erodes confidence in government.

Finally, industrial policy infringes on economic liberty by the government placing an (at times, heavy) finger on the scale of private economic transactions. Economic liberty is not sacrosanct, of course, and there are many good reasons for it to be violated in a democratic-capitalist system. But the freedom to engage in commercial transactions without government interference should be the default position in a free society. Free markets use the voluntary cooperation and choices of millions of workers, households, and businesses each day to coordinate economic activity and shape economic outcomes, free from coercion. The more the government is involved in determining the nation's industrial and employment composition, the larger its scope and scale. This becomes a threat not just to economic liberty, but to political liberty as well.

THE DEFICIT IS A THREAT TO DEMOCRATIC CAPITALISM

In addition to growing bipartisan support for industrial policy, a second major threat to democratic capitalism is the ballooning national debt.

America's fiscal outlook is deeply troubling. In the 1980s and 1990s, the amount of U.S. public debt was around 39 percent of annual GDP. By 2010, the debt had grown to around 61 percent of GDP. The nonpartisan Congressional Budget Office projects that the national debt will keep growing over the coming decades. Next year, CBO expects the size of the debt to equal the amount of output produced by the economy. By 2034—only ten years from now—CBO expects the debt to rise to 122 percent of GDP.

While it is the case that Presidents George W. Bush and Donald Trump substantially reduced the level of tax revenue through their tax cuts, the growth in the projected national debt is properly thought of as a spending problem. The reason for this is simple: Spending is projected to grow over the coming decades, while revenue is not projected to decline.

In fact, the opposite is true. Over the past half century, the amount of tax revenue collected by the government has averaged 17.3 percent of annual GDP. Over the next decade, the CBO expects that tax revenue will be slightly higher than its historic average, rising to 18 percent of GDP. CBO projects government spending to rise from its historic average of 21 percent of GDP to nearly 25 percent of GDP by 2034.

This makes clear: The U.S. has a spending problem, not a revenue problem. Of course, more revenue would reduce the budget deficit. But increased revenue would only shrink the level of the deficit. Because the trend of rising deficits (and, therefore, accumulating debt) is driven by spending that is projected to increase, more revenue doesn't change the long-term budget outlook. According to the Committee for a Responsible Federal Budget's debt model, fully repealing the 2017 tax cuts, along with increasing taxes on capital income, would reduce the expected debt-to-GDP ratio in 2050 by only three percentage points, from 160% to 157%.

Despite these projections, neither Vice President Harris nor President Trump want to discuss the U.S.'s dire fiscal situation. (In fact, the word "debt" was not even mentioned during the candidates' one-and-only presidential debate.) The Trump-Pence administration did not take any meaningful action to reduce the structural deficit. Neither did the Biden-Harris administration.

The national debt, if left unaddressed, could trigger a fiscal crisis in which eroding investor confidence leads to a large spike in interest rates. It could also lead investors' expectations of future inflation to drift above the Fed's target, which would also lead to higher interest rates.

But all is not well in the absence of a crisis. High debt and deficits have been subtly damaging the economy for decades, and will continue to do so until they are addressed. Each additional dollar of deficit spending lowers private investment spending. Less investment leads to a smaller stock of capital, which in turn causes slower productivity growth. Workers who are less productive earn lower wages and incomes. And lower wages leads to fewer adults participating in the workforce.

Beyond slower productivity growth, lower wages, and less workforce participation, large federal outlays for debt service reduces the political space for needed investments in national defense, scientific research, and opportunity policies.

The national debt threatens democratic capitalism not only by weakening the economy and hurting the economic prospects of current and—importantly—future workers. In addition, it is a symptom of the political system demonstrating inadequate concern for the economy. The structural budget deficit is not a pawn in a political chess match between the two political parties. Instead, the lack of concern both parties have shown for fiscal consolidation is a sign that the political system is not responsive enough to real economic challenges.

CONCLUSION

The fall of 2024 finds the United States on track to overcome the surge in consumer price inflation that began in 2021. That surge can be understood in large part as an imbalance in our system of democratic capitalism. But two

other major threats to democratic capitalism remain: the growing bipartisan support for industrial policy and the growing bipartisan indifference towards addressing the national debt.

Even given these threats, democratic capitalism remains healthy in the United States. The economy continues to provide the employment opportunities, wage growth, and prosperity that support the legitimacy and longevity of liberal democracy. And, in the main, the U.S. political system largely respects the boundaries it must place on itself to maintain a market economy free enough to drive prosperity forward.

Over the long run, democracy cannot survive without free markets and capitalism cannot persist without democratic politics. This marriage matters. At the time of this writing, the outcome of the 2024 presidential election is unknown. It would benefit the winner of that contest to remember that damage to one half of this marriage damages the whole.

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Suggested Readings

Alami, Ilias, and Dixon, Adam. *The Spectre of State Capitalism.* Oxford University Press, 2024.

Applebaum, Anne. *Twilight of Democracy: The Seductive Lure of Authoritarianism.* Vintage Books, 2020.

Friedman, Milton. *Capitalism and Freedom.* University of Chicago Press, 1962 and 2020.

Fulcher, James. *Capitalism: A Very Short Introduction.* Oxford University Press, 2015.

Gorsuch, Neil, and Nitze, Janie. *Overruled: The Human Toll of Too Much Law.* Harper, 2024.

Leonhardt, David. *Ours Was the Shining Future: The Story of the American Dream.* Random House, 2023.

Petrou, Karen. *Engine of Inequality: The Fed and the Future of Wealth in America.* Wiley, 2021.

Sharma, Ruchir. *What Went Wrong with Capitalism.* Simon & Schuster, 2024.

Smith, Adam. *The Theory of Moral Sentiments.* Various, 1759, 1790, 2016.

Stiglitz, Joseph. *The Road to Freedom: Economics and the Good Society.* W.W. Norton & Company, 2024.

Addendum | U.S. Government Debt: An Unsustainable Trajectory

"I do believe we need to reduce deficits […] to stay on a fiscally sustainable path."

Treasury Secretary Janet Yellen, February 2024

"America's debt is on an unsustainable path. The CBO projects that America's debt-to-GDP ratio will surpass its second world war high of 106% by the end of the decade and keep rising."

Editorial Board, *Financial Times,* May 2024

"Can America Afford Its Debts?"—this question, raised by *The Economist* magazine in July 2024, is as important as it is timely. Throughout our 2024 report, we've analyzed the pervasiveness and effectiveness of government industrial policy. However, even if such policies are effective in some cases, can governments afford them over the long-term? *The Wall Street Journal* editors are dubious: "The debt and deficit should be a big topic of debate during the 2024 election […] Politicians can look away from the spending problem, but the fiscal math can't be escaped."[1]

THE FACTS

In April 2024, the International Monetary Fund ranked countries by the net level of national debt as a percent of GDP. Net debt of advanced economies averaged 82% of GDP, while that of emerging economies averaged 44%. The United States debt level is at 98% of GDP, the highest level since World War II, with only three developed nations ranking higher (France, Italy, and Japan).[2]

In the U.S., government deficits, where annual borrowing outpaced receipts, began in response to the Great Depression and during the Second World War, but they didn't gain significant momentum until more recently. Since the 1950s, the U.S. annual deficit ranged between 1% and 5% of GDP; however, deficits jumped to 10% of GDP during the 2008-2009 financial crisis and 15% in 2020 as the coronavirus pandemic set in. Government forecasters project that U.S. deficits will be 6-7% of GDP through 2034, growing the national debt to $51 trillion, 122% of projected GDP. [3]

[1] The Editorial Board, "Whistling Past a $1.9 Trillion Federal Deficit," *Wall Street Journal,* August 12, 2024.

[2] IMF Datamapper, "Net debt as % of GDP", https://www.imf.org/external/datamapper/GGXWDN_G01_GDP_PT@FM/ADVEC/FM_EMG/FM_LIDC, accessed August 17, 2024.

[3] "An Update to the Budget and Economic Outlook: 2024 to 2034," Congressional Budget Office, June 2024.

If deficits and debt are cause for concern, why not just cut spending and solve the problem? It's not as easy as it sounds. In 2023, U.S. spending for mandatory programs (Social Security, Medicare, and Medicaid primarily) made up over 60% of the annual budget, with spending on defense and interest payments comprising another 24%. That leaves just 16% of other discretionary spending categories to scrutinize[4]—but lawmakers either don't recognize the gravity of the problem or lack the political will to act.

RATIONALE

Governments justify budget deficits by asserting that spending is necessary to maintain social welfare (health care, education, retirement benefits), promote the common defense (military), and ensure the enforcement of laws and regulations. Beyond these foundational categories, some also believe that government spending can stimulate the economy and prop institutions and individuals up during crises. In recent history, the U.S. government intervened to rescue large banks from potential failure during the 2008-2009 financial crisis—and to protect citizens from economic hardship during the COVID-19 pandemic.

Other voices claim that the worries over America's growing national debt are overblown. In July 2024, an opinion contributor to the *Financial Times* pointed to U.S. economy's growth in net national wealth as an offset to high debt levels, and the relatively low tax levels leaving spare fiscal capacity if higher revenue is essential in the future economic equation. In addition, U.S. currency is still the global reserve currency and enjoys higher demand for its liabilities.[5] All this may be true, but the spare fiscal capacity is only helpful if politicians are willing to make hard choices for long-term fiscal benefits (i.e., raise taxes and/or cut spending) versus focusing on near-term election outcomes.

WARNINGS

In December 2023, the Council on Foreign Relations warned that "…economists, investors, and lawmakers are raising alarm bells about the U.S. national debt."[6] The essay also emphasizes the unsustainability of the future trajectory unless politicians are up to the task of making hard decisions:

> Some economists fear that continued growth of the national debt could undermine U.S. global leadership by leaving fewer dollars for U.S. military, diplomatic, and humanitarian operations around the world. Other experts worry that large debts could become a drag on the economy or precipitate a fiscal crisis, arguing that there is a tipping point beyond which large accumulations of government debt begin to slow growth. Under this scenario, investors could lose confidence in Washington's ability to right its fiscal ship and become unwilling to finance U.S. borrowing without much higher interest rates. This would result in even larger borrowing costs, or what is sometimes called a debt spiral. A fiscal crisis of this nature could necessitate sudden and economically painful spending cuts or tax increases.[7]

More voices are joining the warning chorus. In March 2024, the non-partisan Congressional Budget Office ("CBO") confirmed rising deficits and debt for the U.S. in its "Long-Term Budget Outlook." The CBO also outlined the likely consequences of the large and growing federal debt including:

- Reduced economic growth. "Large and growing federal debt would, over time push up the cost of borrowing, reduce private investment, and slow the growth of GDP, all else being equal."

[4] Ibid.
[5] Beck-Friis, Peder, "There Is No Need for Investors to Panic Over Government Debt," *Financial Times,* July 17, 2024.
[6] Berman, Noah; McBride, James; and Siripurapu, Anshu, "The U.S. National Debt Dilemma," Council on Foreign Relations," December 4, 2023, https://www.cfr.org/backgrounder/us-national-debt-dilemma, accessed August 22, 2024.
[7] Ibid.

- Higher interest payments to foreign investors. "…The government would spend more on interest payments, including payments to foreign investors, who currently hold roughly one-third of that debt overall. […] Increases in interest payments to foreign investors would, in turn, reduce the nation's net international income."
- Increased risk of fiscal crisis. "The likelihood of a fiscal crisis would increase as federal debt—measured in relation to the size of the economy—continued to rise, because mounting debt could erode investors' confidence in the U.S. government's fiscal position."
- Less fiscal capacity to respond to emergencies or other unforeseen priorities. "If the amount of debt was already large, policy makers might feel constrained from using deficit-financed fiscal policy to respond to unforeseen events, promote economic activity, or further other goals."[8]

It seems to be a question of when, not if, the United States will have to reckon with the long-term consequences if the ship is not righted in the short-term.

CONCLUSION

When it comes to the U.S. government's approach to fiscal policy, there are many points still up for debate. However, what's not up for debate is the current size of the federal debt and the fact that, without significant policy changes, it's going to continue to grow. Returning to the *Economist's* initial question, "Can America Afford Its Debts?", we believe a better question is: "What can we as a society do now to strengthen our national fiscal health for future generations?". The answers will not be easy, but there's no time to waste.

"I've been asked if I have any regrets. Well, I do. The deficit is one."

President Ronald Reagan, Farewell Address, January 1989

[8] "The Long-Term Budget Outlook: 2024 to 2054," Congressional Budget Office, March 2024, pp. 10-11.

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