



Emerging Risks in (Re)Insurance

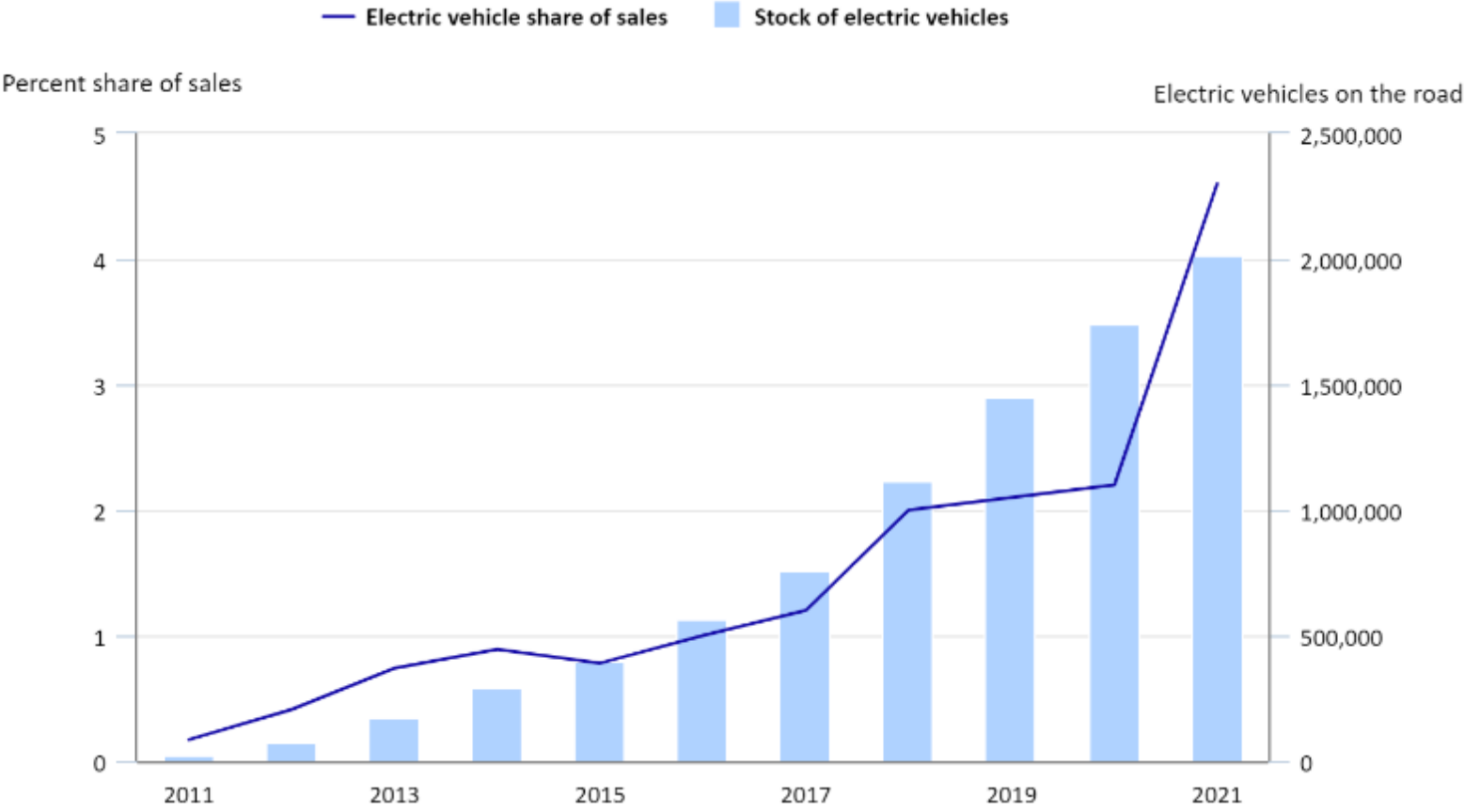
Lorie Graham, CPCU, ARe, ALCM, ARM, ARC, AIAF, AIM, ARP
Senior Vice President and Chief Risk Officer

June 8, 2023

Electric Vehicle Battery Hazards



Electric Vehicle (EV) Adoption



Note: includes battery electric vehicles and hybrid vehicles.

Source: International Energy Agency

Electric Vehicle Batteries

- EVs require high-energy batteries
- Protection circuits are necessary to maintain charging and discharging within safe limits
- Different for every manufacturer

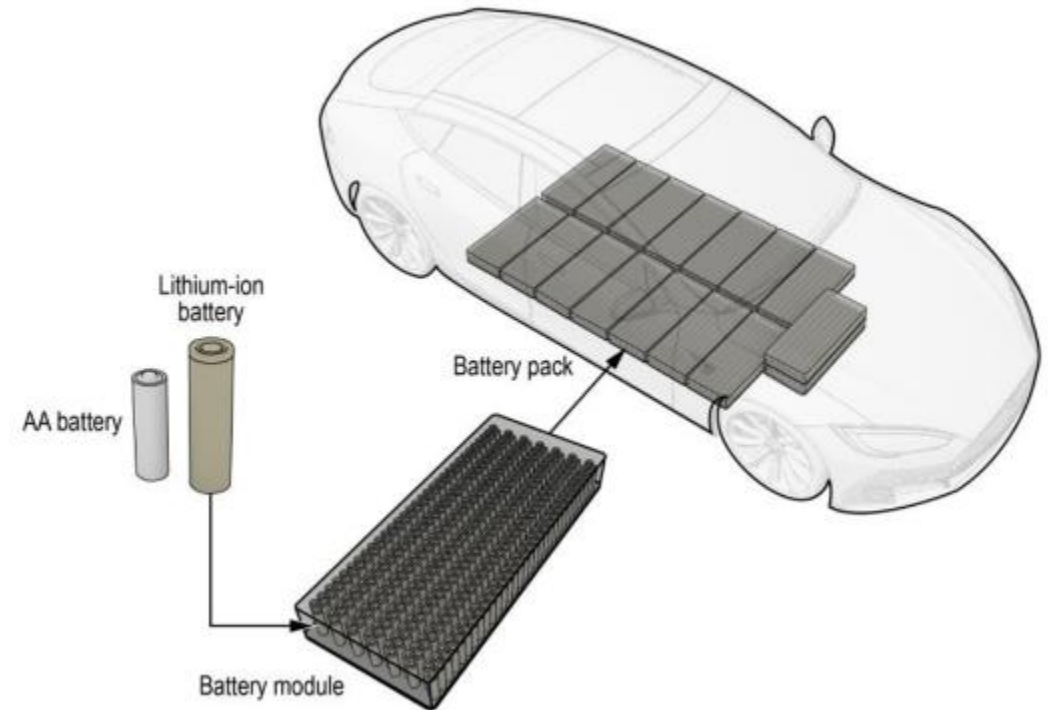


Illustration of Tesla model S showing location of battery pack and details of module and battery cell, with size comparison to standard AA battery. (NTSB drawing)

Cost of an EV battery replacement



\$145/kWh - \$727/kWh
\$2,500 - \$16,000

BMW i3



\$250/kWh - \$271/kWh
\$16,000 - \$16,250

Chevrolet Bolt



\$152/kWh - \$467/kWh
\$3,000 - \$8,000

Chevrolet Volt



\$1,829/kWh
\$2,853.53

Hyundai Ioniq



\$137/kWh - \$187.5/kWh
\$5,500 - \$9,500

Nissan Leaf



\$180/kWh
\$15,799.27

Tesla Model 3



\$12,000
- \$22,000

Tesla Model S



\$654/kWh
\$23,442.91

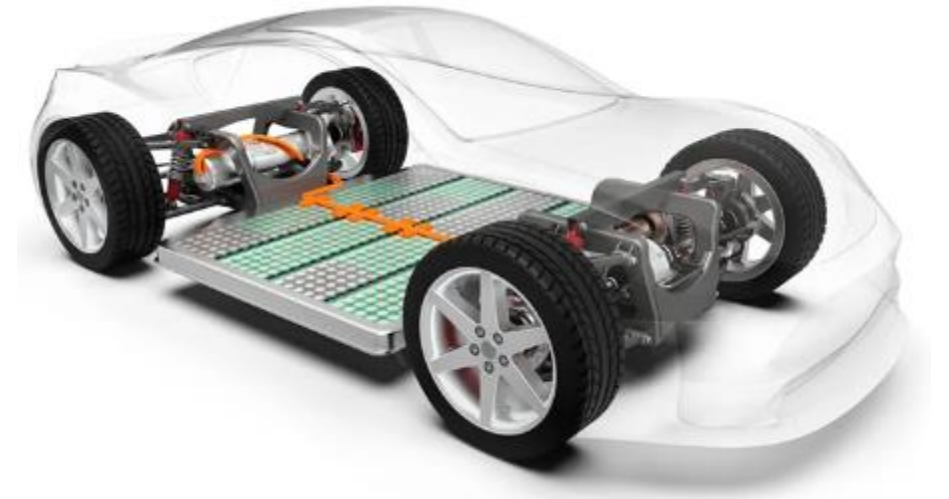
Volkswagen e-Golf

Safety Risks – Thermal Runaway

Primary causes

Safety Risks – Stranded Energy

- Stranded energy in a damaged battery
 - Energy remains with no way to discharge it
 - Can cause battery to reignite
- Mitigations
 - Engineers or specialists can assess remaining voltage
 - Some batteries have built-in discharge ports



Electric Vehicle Battery Fires

- Uncontrolled chemical reaction inside the vehicles' high-voltage lithium-ion batteries release a huge amount of heat and continues until the reaction is completed
- Lithium batteries burn hotter and last much longer than gas fires
- EV fires can take tens of thousands of gallons of water to extinguish



Source: National Transportation Safety Board

Difficult to Extinguish



Source: National Transportation Safety Board

Public Safety



Source: National Transportation Safety Board

It's Not Just Crashes



Source: National Transportation Safety Board

Other EV Concerns

- Salvage and repair
- EV battery production emits more CO₂ than fossil fuel models
- Water intrusion from flood causing thermal runaway
- Reliability and down time
- Complex electronic systems (sensors and wiring)
- Fewer shops with EV technicians to make repairs

Future of EV

14%

Would **definitely buy** or lease an EV

22%

Would **consider buying** or leasing an EV

-
- As technology and affordability improve – wider spread adoption expected
 - Understand and price for unique exposures
 - Partner with EV service providers
 - Educate about the unique hazards of EV

Abuse and Molestation Exclusion and Human Trafficking



Civil Trafficking Lawsuits

- Trafficking Victims Protection Reauthorization Act (TVPRA or Act)
- 2004 – 2019 federal civil trafficking cases increased over by a factor of fourteen
- The targets of these lawsuits are not only the active perpetrators of the trafficking but also legitimate businesses that the public interacts with every day

Federal Civil Trafficking Cases 2021

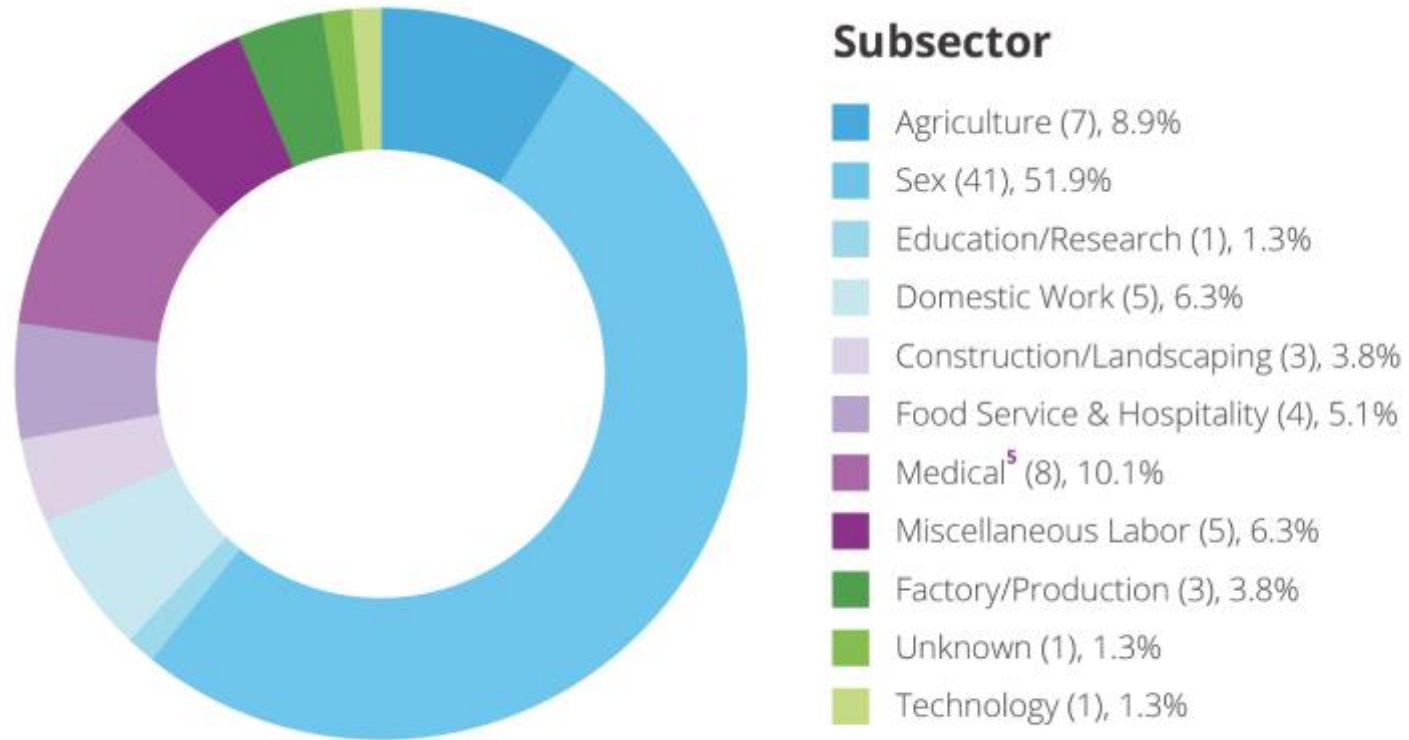


Figure C: Civil Cases by Subsector (2021) (Total = 79)

Trafficking Cases Filed by Year

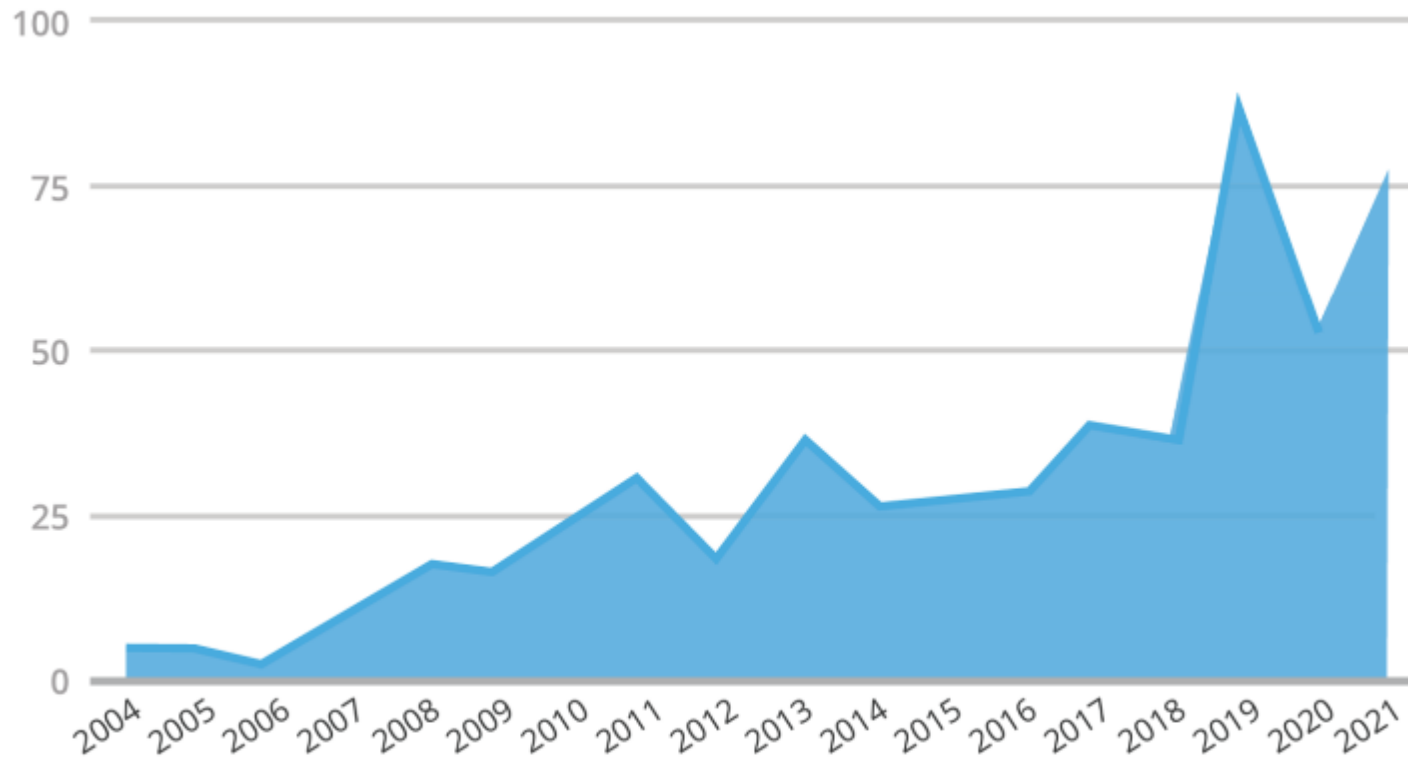


Figure 1: Cases Filed by Year: (2003-2021) (Total = 539)

Civil Trafficking Cases by Location

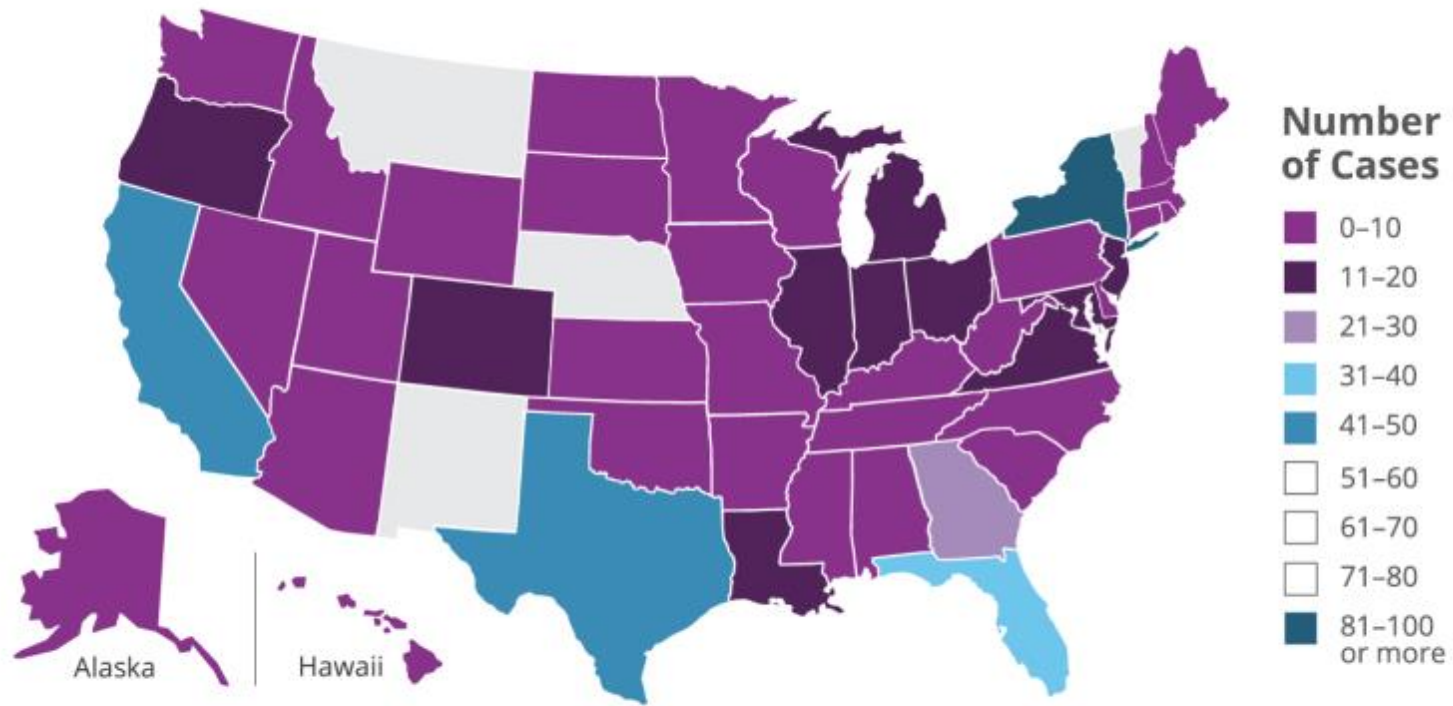


Figure 3: Federal Cases Filed by Location of Filing (Map) (2003-2021)

Defendants in Civil Trafficking Cases

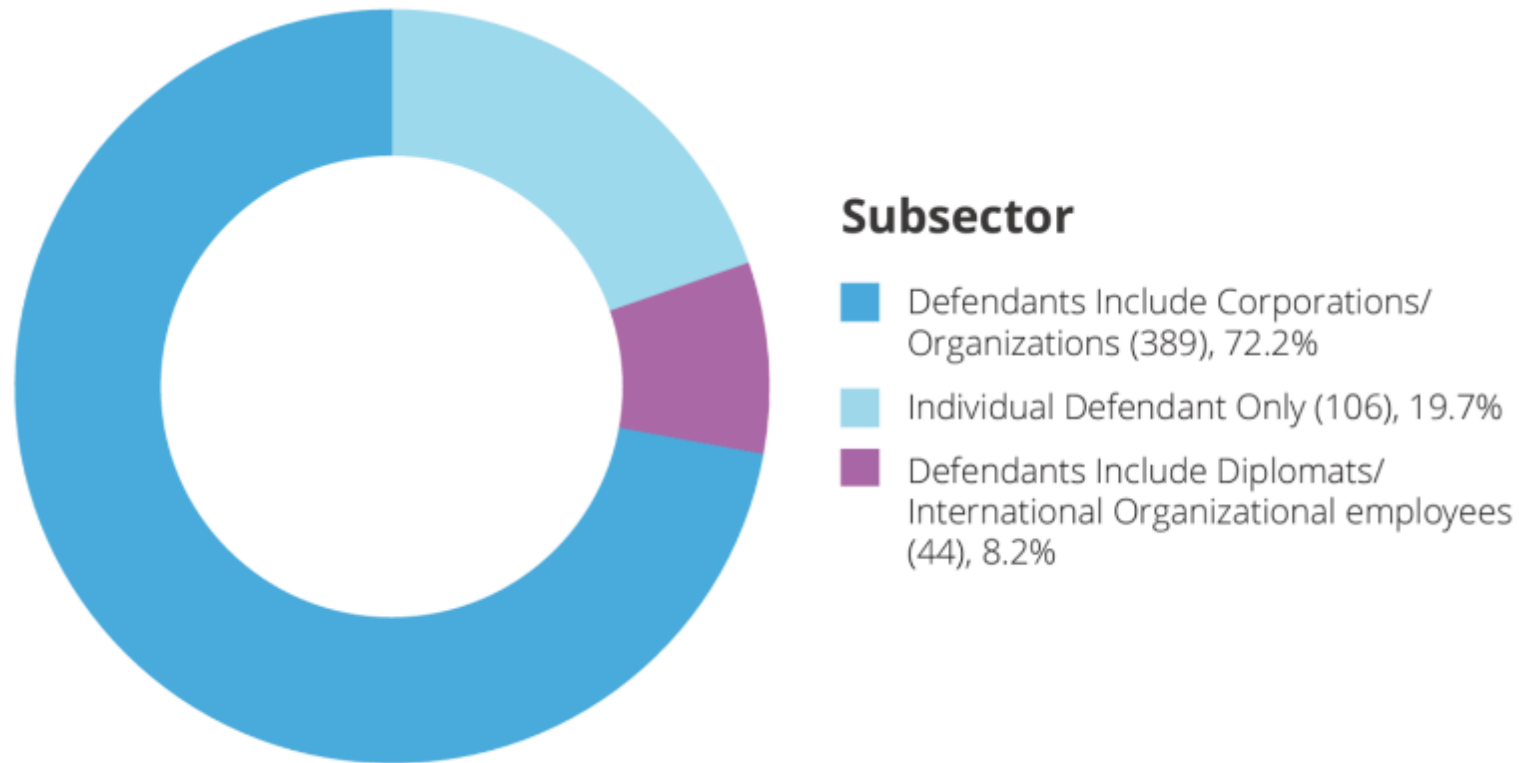
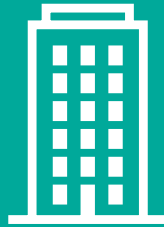


Figure 15: Types of Defendants in Civil Trafficking Cases (2002-2021) (Total = 539)

Industries at Risk



Hotels



Apartments



Transportation
Companies



Massage
Parlors

Source: United Nations Office on Drugs and Crime

Millers Capital Ins. Co. v. Vasant

- 2014 trafficking incident
- Insurer denied defense and indemnity
- The policy contained endorsement CG 21 46 07 98, which excluded injury “arising out of the actual or threatened abuse or molestation by anyone of any person while in the care, custody or control of any insured”
- The policy didn’t define care, custody or control
- The court considered the common use definitions of care, custody or control with the facts of the case
- The court found unknown guests were not in the care, custody or control of the hotel and therefore the abuse or molestation exclusion did not apply

ISO's Abuse and Molestation Exclusions

ABUSE OR MOLESTATION EXCLUSION (CG 21 46 07 98)

This insurance does not apply to "bodily injury", "property damage" or "personal and advertising injury" arising out of:

1. The actual or threatened abuse or molestation by anyone of any person while in the care, custody or control of any insured, or

BROAD ABUSE OR MOLESTATION EXCLUSION (CG 40 28 09 22)

This insurance does not apply to damages arising out of:

1. The actual, alleged or threatened abuse or molestation, including but not limited to sexual abuse or sexual molestation, of any person committed by anyone; or

- ISO withdrawing CG 21 46 and filing CG 40 28
- Removal of CCC language in the CG 40 28, which takes away requirement of **physical possession** which may apply in some states
- Reviver statutes in 20 jurisdictions potentially increase carrier's exposure to abuse and molestation claims

PFAS: A Sticky Situation



Per- and Polyfluoroalkyl Substances Overview

- **Very large class of synthetic chemicals**
- **PFAS class includes over 10,000 known chemicals plus many unknown**
 - About 1,200 are registered in the US for use in industrial and consumer products
 - Primarily PFOA and PFOS have been the target of litigation
- **Concerns**
 - PFAS are mobile: they can move through water and air



PFAS: Persistent, Bioaccumulative, Toxic (PBT)

- **Persistent** in the environment: can last centuries or thousands of years
- **Bioaccumulative** in organisms: they can stay in the body for some time
- **Toxic** at relatively low part-per-trillion (ppt) levels
 - **Exposure**
 - Drinking contaminated municipal water or well water
 - Eating fish caught from water contaminated by PFAS
 - Swallowing contaminated soil or dust
 - Eating food grown or raised near places that used or made PFAS
 - Eating food packaged in material that contains PFAS
 - Using consumer products such as stain-resistant carpeting or water-repellent clothing

Contributors of PFAS in Air, Soil, and Water

- PFAS manufacturing facilities
- Facilities using PFAS in production of other products
- Areas used by firefighters for training with AFFF (firefighting foam called Aqueous Film Forming Foam)
- Airports
- Military installations



Source: EPA website and EPA webinar "EPA and NEHA Webinar: PFAS Research" and Agency for Toxic Substances and Disease Registry,

How Are **PFAS** Affecting Agriculture?



Stoneridge Farm in Arundel, Maine



Discovered in 2015, milk contained high amounts of PFAS contamination from state-licensed sludge used for fertilizer 20 years earlier



PFAS levels of 1,420 parts per trillion; more than 7x the 210 ppt limit later set by the state



Owner, Fred Stone, had to cull more than half of his herd



Stone was denied federal assistance for his tainted milk because one of its milk tests came in just below the state's limit, but not comfortable selling it

Source: The Guardian, "I don't know how we'll survive: the farmers facing ruin in Maine's 'forever chemical' crisis", March 22, 2022, by Tom Perkins and "Lawmakers Consider State Buyback Program For Farms Ruined by Tainted Sludge", February 13, 2023 by Penelope Overton

Songbird Farm in Unity, Maine



Farm purchased by couple in 2014 to produce organic vegetables



Previous owners had used PFAS-contaminated sludge decades earlier



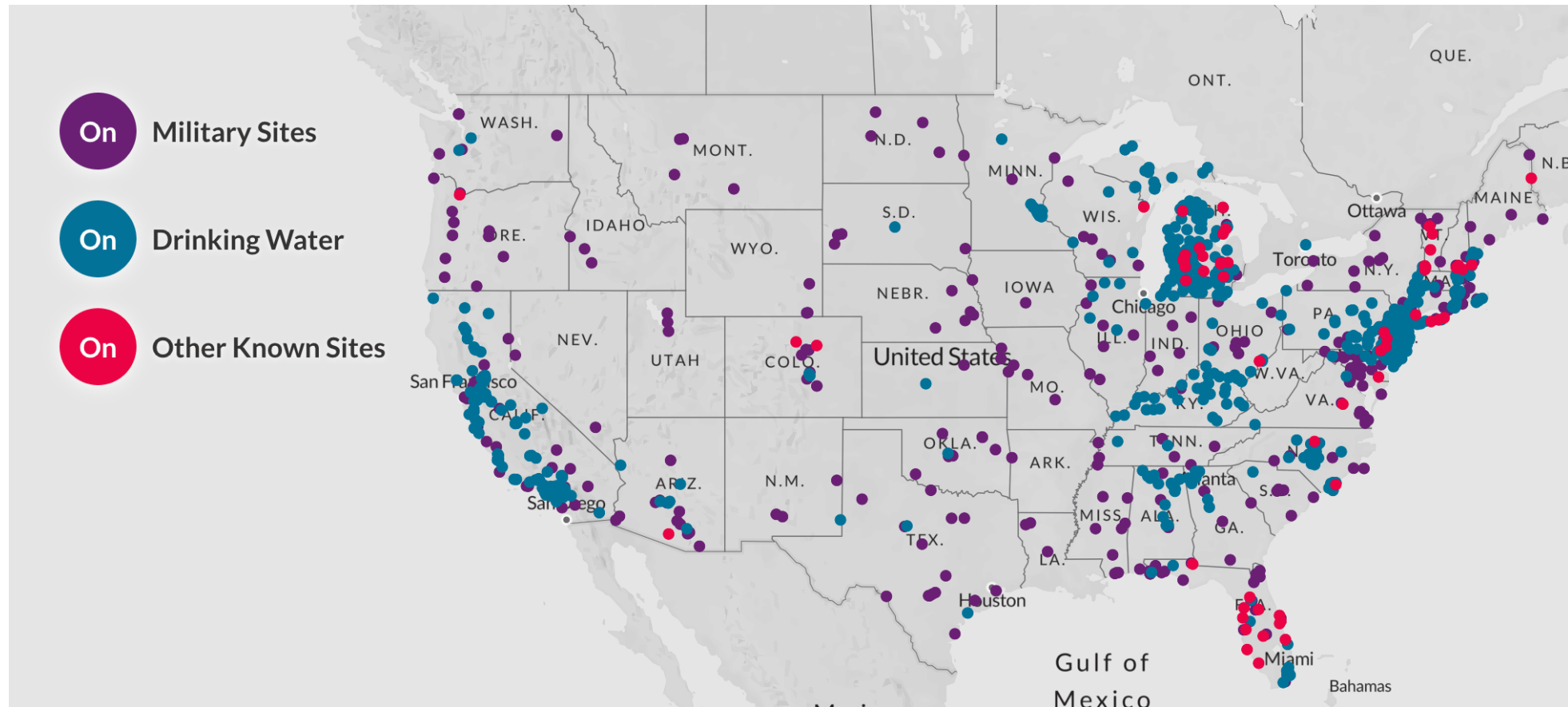
Testing revealed that the water, crops, and chickens were contaminated with PFAS



The farm owners recalled products, informed customers, and suspended their operation

Source: <https://pfascentral.org/news/i-dont-know-how-well-survive-the-farmers-facing-ruin-in-maines-forever-chemicals-crisis> and <https://www.theguardian.com/environment/2022/mar/22/i-dont-know-how-well-survive-the-farmers-facing-ruin-in-americas-forever-chemicals-crisis>

PFAS Contamination in the U.S.



https://www.ewg.org/interactive-maps/2021_suspected_industrial_discharges_of_pfas/map/

EPA's PFAS Strategic Roadmap 2021-2024

1

Research – Invest in research, development, and innovation to increase understanding of PFAS

2

Restrict – Pursue a comprehensive approach to proactively prevent PFAS from entering air, land, and waters at levels that impact health

3

Remediate – Broaden and accelerate contamination to protect human health

Source: https://www.epa.gov/system/files/documents/2021-10/pfas-roadmap_final-508.pdf

Determination of Liability

What is the source of the exposure?



```
graph TD; A[What is the source of the exposure?] --> B[Who is responsible?]; B --> C[What coverage forms apply?];
```

The diagram consists of three stacked, rounded rectangular boxes. The top box is light blue and contains the text 'What is the source of the exposure?'. A light blue arrow points downwards from the bottom right corner of this box to the top right corner of the middle box. The middle box is orange and contains the text 'Who is responsible?'. A light orange arrow points downwards from the bottom right corner of this box to the top right corner of the bottom box. The bottom box is dark blue and contains the text 'What coverage forms apply?'.

Who is responsible?

What coverage forms apply?

Look Back at Older Forms from Decades Ago

Comprehensive General Liability

- Coverage provided under **1973** and earlier form versions

Commercial General Liability

- Coverage provided under **1986** and later form versions

- Has there been any impairment or exhaustion of the product aggregate limits?
- Does the pollution exclusion apply? Is there an exception for 'sudden and accidental' (S&A) release? How has your state ruled on S&A exceptions?

ISO's CGL Coverage Form



ISO's Commercial General Liability Coverage Form (CG 00 01 04 13)

- “Absolute” pollution exclusion does not apply to BI/PD arising out of an insured’s products, according to ISO
 - Waste may be an exception: If the insured’s product is considered waste, exclusionary language in subparagraphs f.(1)(b) and (c) may apply
 - Possible gray area: Cleanup costs exclusion may appear to be a “total” exclusion, thus applying to pollution arising out of an insured’s products
 - ISO’s 1988 revision to the CGL attempted to clarify the intent
- ISO’s CGL policy may provide some limited products liability coverage for BI/PD arising out of pollutants, but a complete review of the policy, applicable regulations, and case law is needed

Source: <https://www.irmi.com/articles/expert-commentary/the-cgl-pollution-exclusion>

Pollution Liability Insurance

Provisions to consider

Coverage trigger

- Claims-made vs occurrence
- Individual state case law regarding exposure theory

Exclusions

- Expected or intended injury or damage
- Damage to property
- Punitive damages

Misinformation, Disinformation, and Malinformation



Distorting the Truth

Falseness

Misinformation

Unintentional mistakes such as inaccurate photo captions, dates, statistics, translation, or when satire is taken seriously.

Disinformation

Fabricated or deliberately manipulated audio/visual content. Intentionally created conspiracy theories or rumors.

Malinformation

Deliberate publication of private information for personal or corporate public interest. Deliberate change of context, date or time, or genuine content.

Intent to harm

Crimes Using Disinformation Attacks



Financial

Deep fake of CEO voice used to request fraudulent transfer of funds



Competitive disruption

Fake news story reports takeover of a company, resulting in downward spike in shares



Market disruption

Foreign competitor reported health issues related to 5G; public concern caused delay in 5G implementation



Political messaging

Promotional message and fake hashtags to damage a company's brand

DaaS Is on the Rise

- Commercial disinformation as a service
 - Publish articles in media sources
 - Create authentic-looking social media accounts in bulk
 - Use established and new accounts to propagate content
- Affordable
 - \$15-\$45 to create a 1,000-character article
 - \$65 to contact a media source directly to spread material
 - \$100 for 10 comments to post on a given article or news story
 - \$350-\$550 per month for social media marketing
 - \$1,500 for search engine optimization services to promote social media posts and articles over a 10- to 15-day period

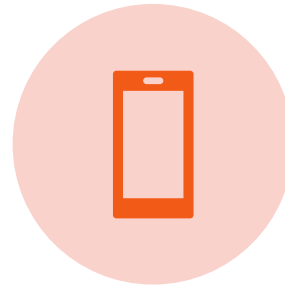


Source: PWC Corporate Sector Disinformation

Unique Characteristics



Untrue information spreads faster and deeper



Blends in with normal natural activity



Technology makes it difficult to detect



Currently no regulation

Impacts to the Insurance Industry

Crime coverages

Will Supply Chain Issues Continue in 2023?



Drivers of Supply Chain Issues



Geopolitical conflict



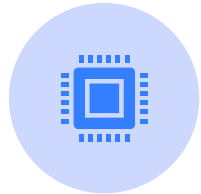
Inflationary pressures



Escalating weather events



Cyber crime



Limited access to materials



Changing footprint of manufacturers and retail operations

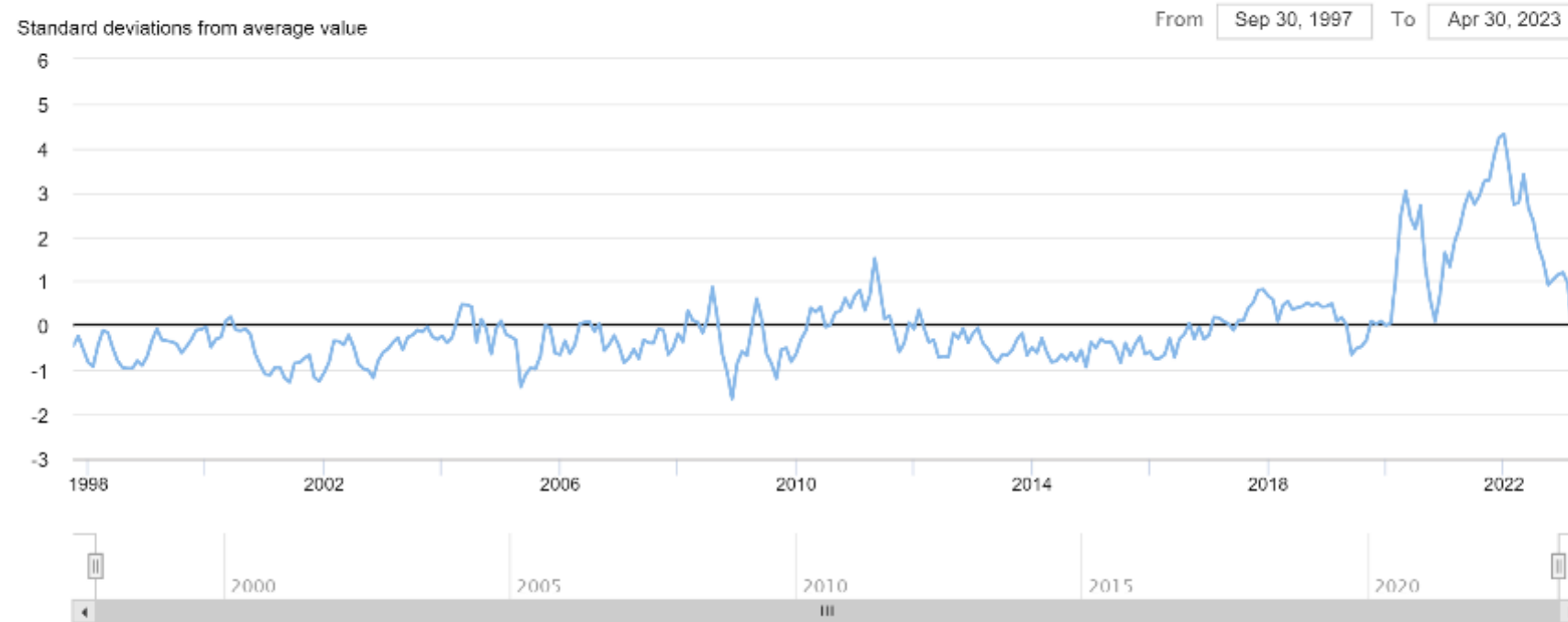
71% of global companies highlight raw material costs as their number one supply chain threat for 2023.

Source: KPMG

Global Supply Chain Pressure Index

Latest Update April 2023

Enter a date range to see monthly estimates or use the slider below to view a specific date range.

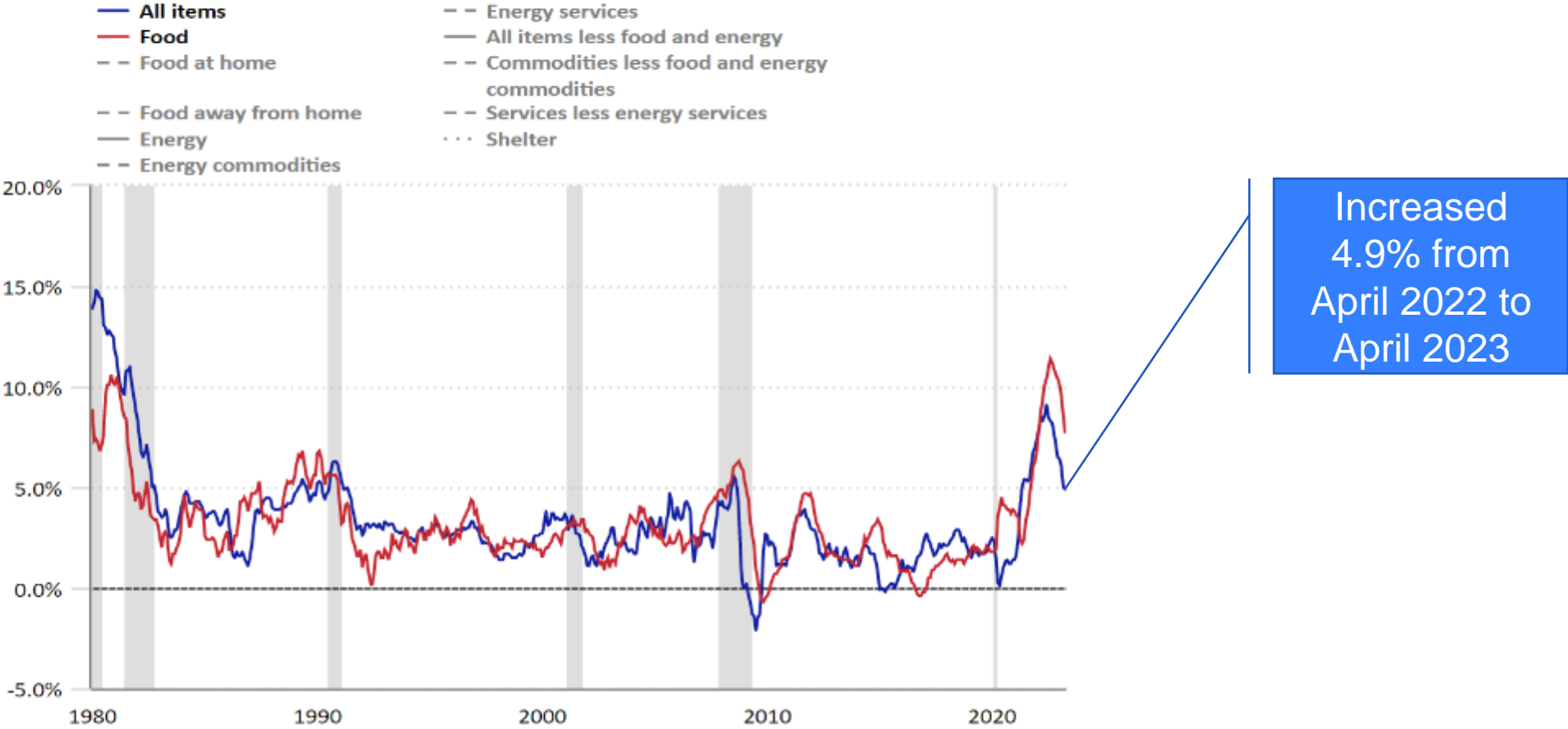


Sources: Bureau of Labor Statistics; Harper Petersen Holding GmbH; Baltic Exchange; IHS Markit; Institute for Supply Management; Haver Analytics; Refinitiv; authors' calculations.

Notes: GSCPI readings for the most recent months can be revised as realized data become available, replacing the imputed values generated through principal component analysis. Further, for some series, mainly the BLS airfreight cost indices, each new release comes with revisions to up to twelve months of previous data. Thus, revisions can have an impact up to a year back in time.

Inflationary Impacts

12-month percentage change, Consumer Price Index, selected categories, January 1980–April 2023



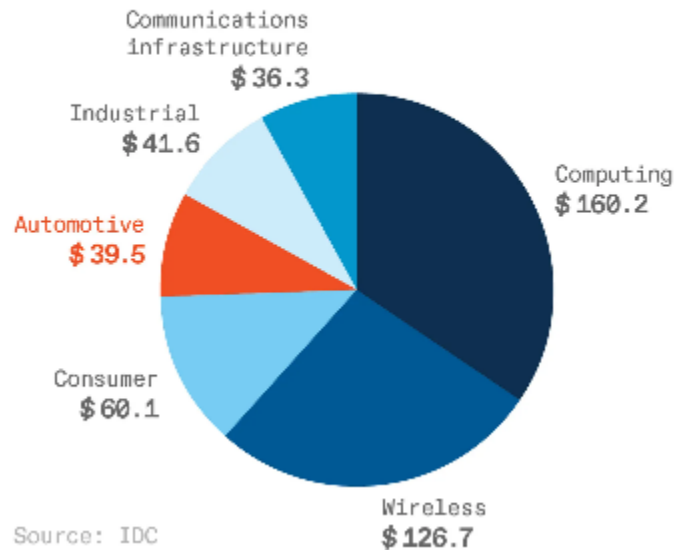
Increased 4.9% from April 2022 to April 2023

Shaded areas represent recessions as determined by National Bureau of Economic Research
Source: U.S. Bureau of Labor Statistics

Semiconductor Shortages

CHIP DEMAND BY REVENUE

(U.S. \$billions)



Source: IDC

Biden-Harris Administration Launches First CHIPS for America Funding Opportunity

As part of implementing the Bipartisan CHIPS and Science Act, Department of Commerce Seeks Applications to Revitalize Domestic Semiconductor Industry and Bring Supply Chains Back to the U.S.

The Biden-Harris Administration through the U.S. Department of Commerce's National Institute of Standards and Technology today launched the first CHIPS for America funding opportunity for manufacturing incentives to restore U.S. leadership in semiconductor manufacturing, support good-paying jobs across the semiconductor supply chain, and advance U.S. economic and national security.

FOR IMMEDIATE
RELEASE
Tuesday, February 28,
2023

Office of Public Affairs
publicaffairs@doc.gov

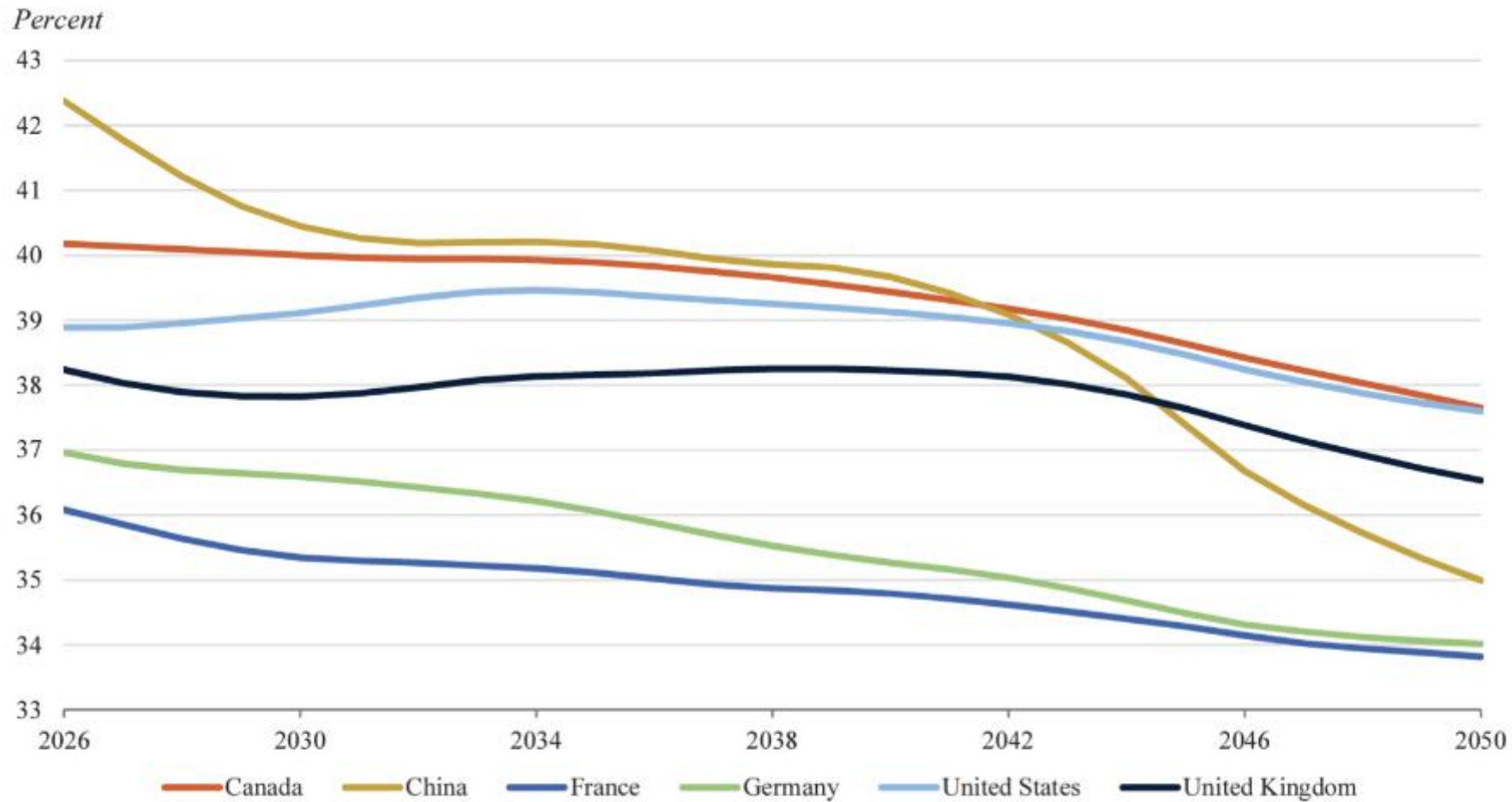


Europe approves its \$47 billion answer to Biden's CHIPS Act — here's everything that's in it

PUBLISHED WED, APR 19 2023 8:26 AM EDT | UPDATED WED, APR 19 2023 5:03 AM EDT

Sources: international Data Corporation, U.S. Department of Commerce, European Commission, CNBC

Percentage of Total Population That Is Prime Age 2026-2050



Sources: World Bank; United Nations Population Projections.

Note: "Prime age" is 25–54 years.

Labor Issues

Chart 4. Percentage of components for total separations, total nonfarm, seasonally adjusted, January 2020–December 2022

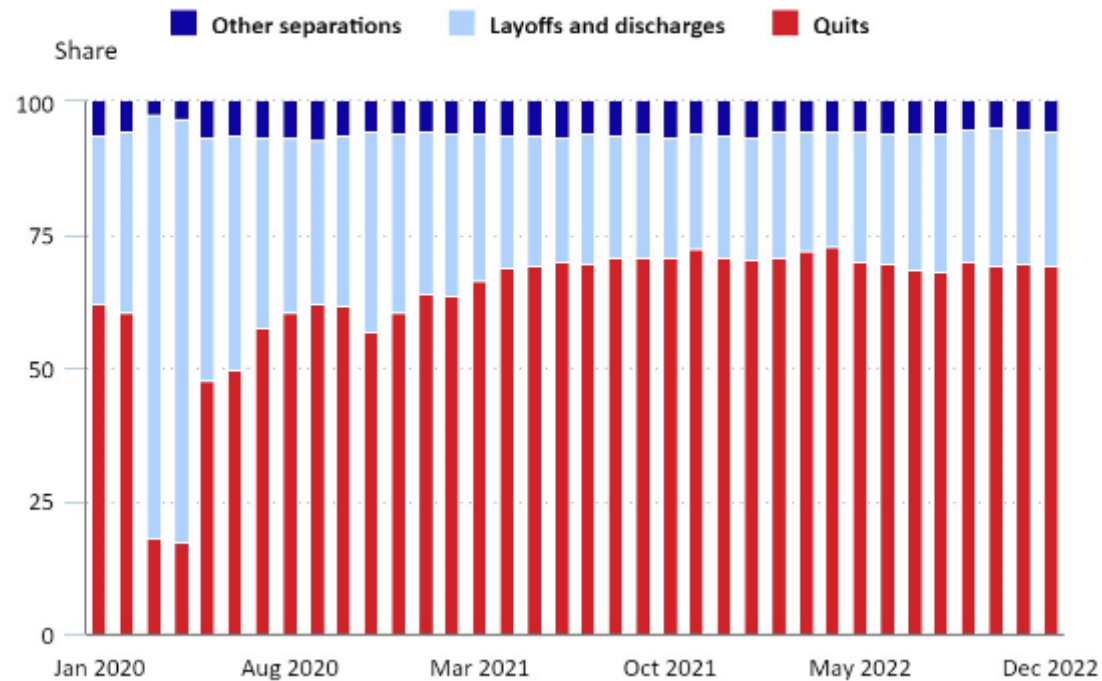
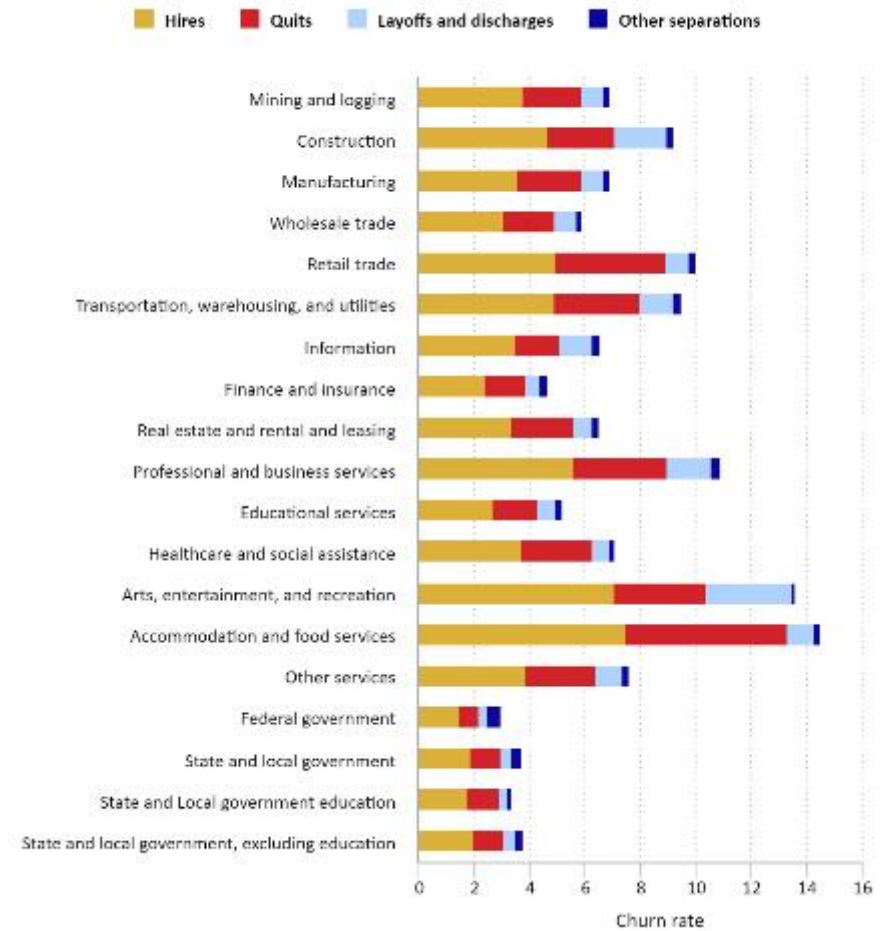


Chart 6. Churn rate and component rates, annual average by industry, 2022



Sources: U.S. Bureau of Labor and Statistics, JOLTS

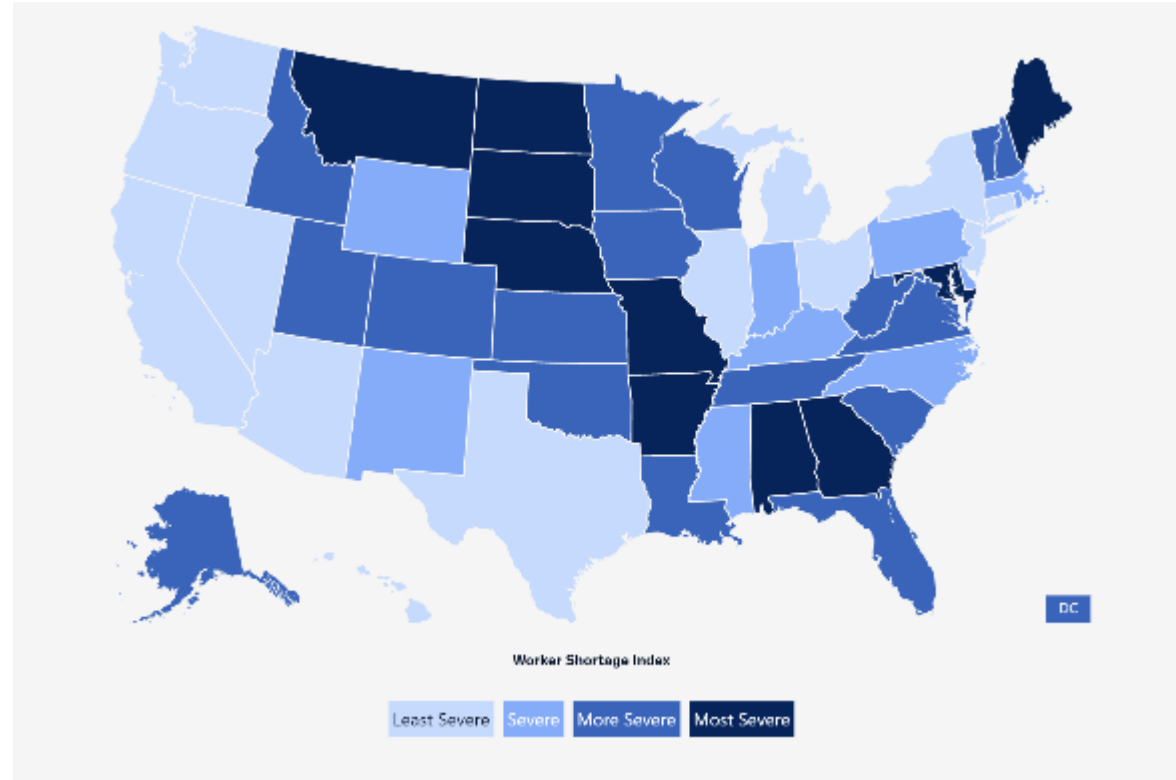
Lots of Jobs But Not Enough Workers

9.5M

open jobs in the U.S.

5.6M

unemployed workers in the U.S.



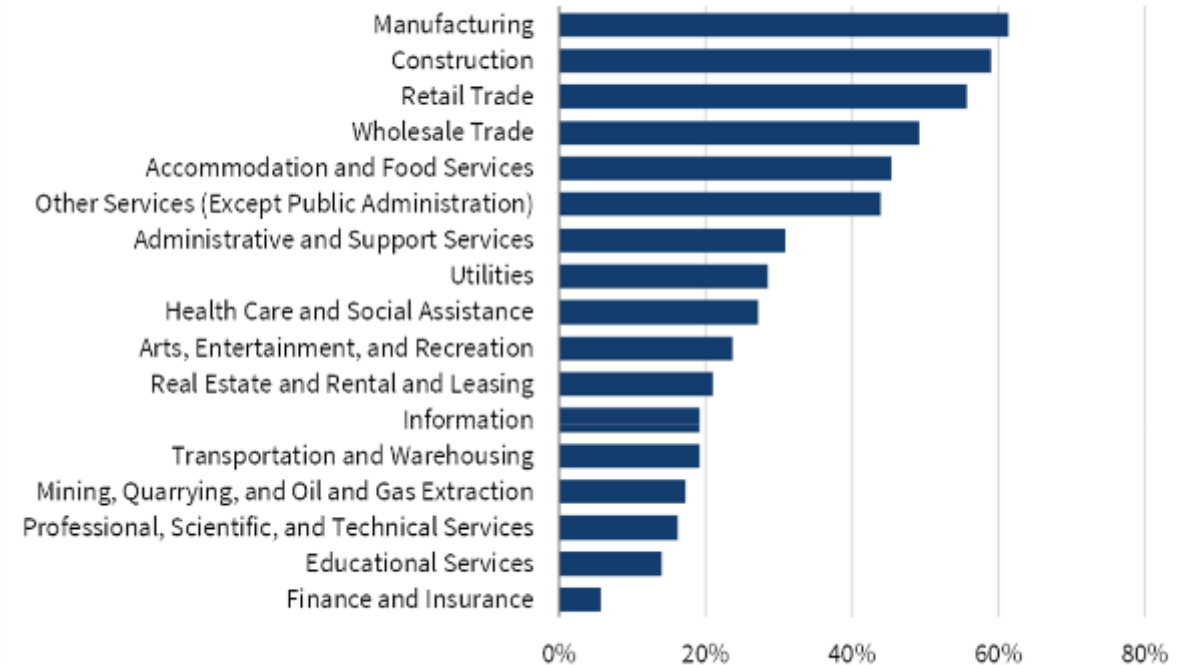
Sources: U.S. Bureau of Labor and Statistics April 2023, U.S. Chamber of Commerce April 2023

Impact to Insurers

- Business interruption
- Contingent business interruption
- Increased claims costs
 - Parts for cars and equipment
 - Rental car number of days increase
 - Unique equipment
 - Increased freight costs
- Employee shortages
 - Inexperienced

Figure 2. Supply-Chain Disruptions By Sector

In the last week, did this business have domestic supplier delays? (percentage saying yes)



Sources: U.S. Census Bureau; CEA Calculations.

Thank You

Schaumburg Office

1501 E. Woodfield Rd.
Suite 300W
Schaumburg, IL 60173
(847) 969-2900

Columbus Office

One Easton Oval
Suite 580
Columbus, OH 43219-6010
(614) 416-5000

