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# live w/ RODNEY LAKE

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Spring 2022

January 20

6:30 PM ET



Investment Institute  
School of Business

# Disclaimer:

This program will be recorded.

We plan to post the recording online and therefore will not use names of audience members to protect the privacy of students.

# Rodney Lake



Vice Dean for Undergraduate Programs

Teaching Instructor of Finance

Director, GW Investment Institute

GW Faculty Member in Residence

# GW Investment Institute Introduction

The GW Investment Institute (GWII) teaches students how to think about investing and invest.

Undergraduate and graduate students serve as analysts and portfolio managers, managing approximately \$8 million in university endowment funds.

The courses cover: equities, real estate, venture capital, and quantitative investing.

GWII links students to industry and industry professionals and provides a platform where our alumni and friends connect.

# Agenda:

- Overview of Semiconductors
- Economy Through Lens of Semiconductors
  - Covid increasing demand
  - Supply chain issues
  - Inflation
- Semiconductor Industry
  - Geographic changes
- Company / Industry News
  - Consolidation of semiconductor industry
  - Increasing capacity in U.S.
- Q&A

# Overview of Semiconductors

# What are semiconductors?

A product that is between an insulator and a pure conductor, they manage the flow of current in devices.

Typically made of silicone. The amount of conductivity can be changed by adding other materials / impurities.

Sometimes referred to as "chips".

Essential for many products: computers, phones, gaming consoles, medical equipment, cars, etc.

It is important for the industry to continuously innovate and keep up with technological changes (typically there is a desire to make the devices smaller and faster, and at a lower cost).

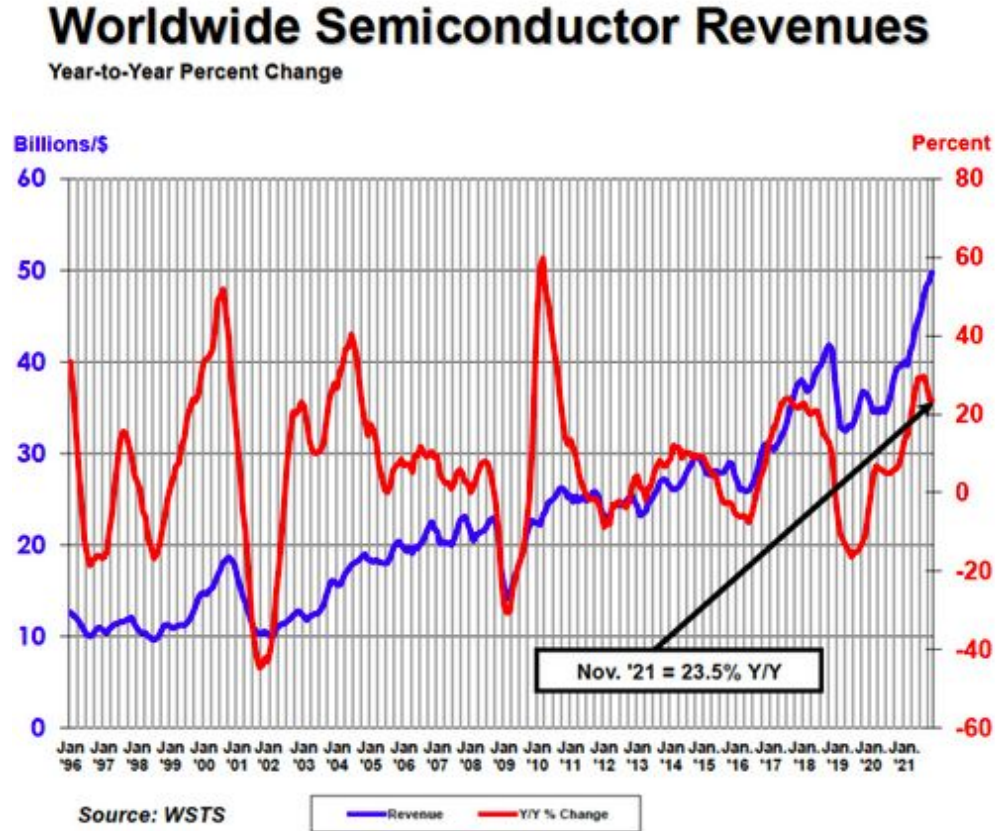


*Photo Source: Industrial Quick Search Manufacturer Directory*

# Economy through lens of semiconductors



# Record number of semiconductors sold



# Supply Chain Issues

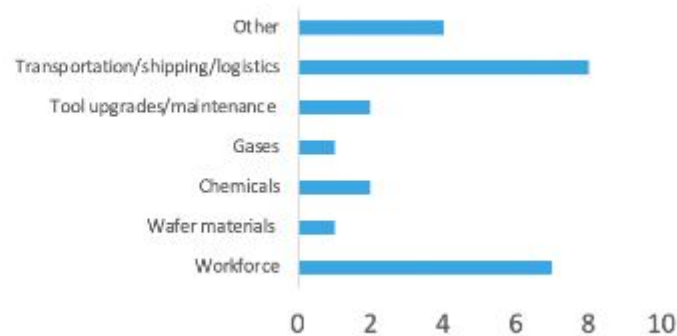
“83% of surveyed firms faced disruptions in operations, research and development as a result of the coronavirus, primarily due to government ordered closures of facilities.”

- March 2020 survey by the Semiconductor Industry Association

Has your company experienced supply chain disruptions?

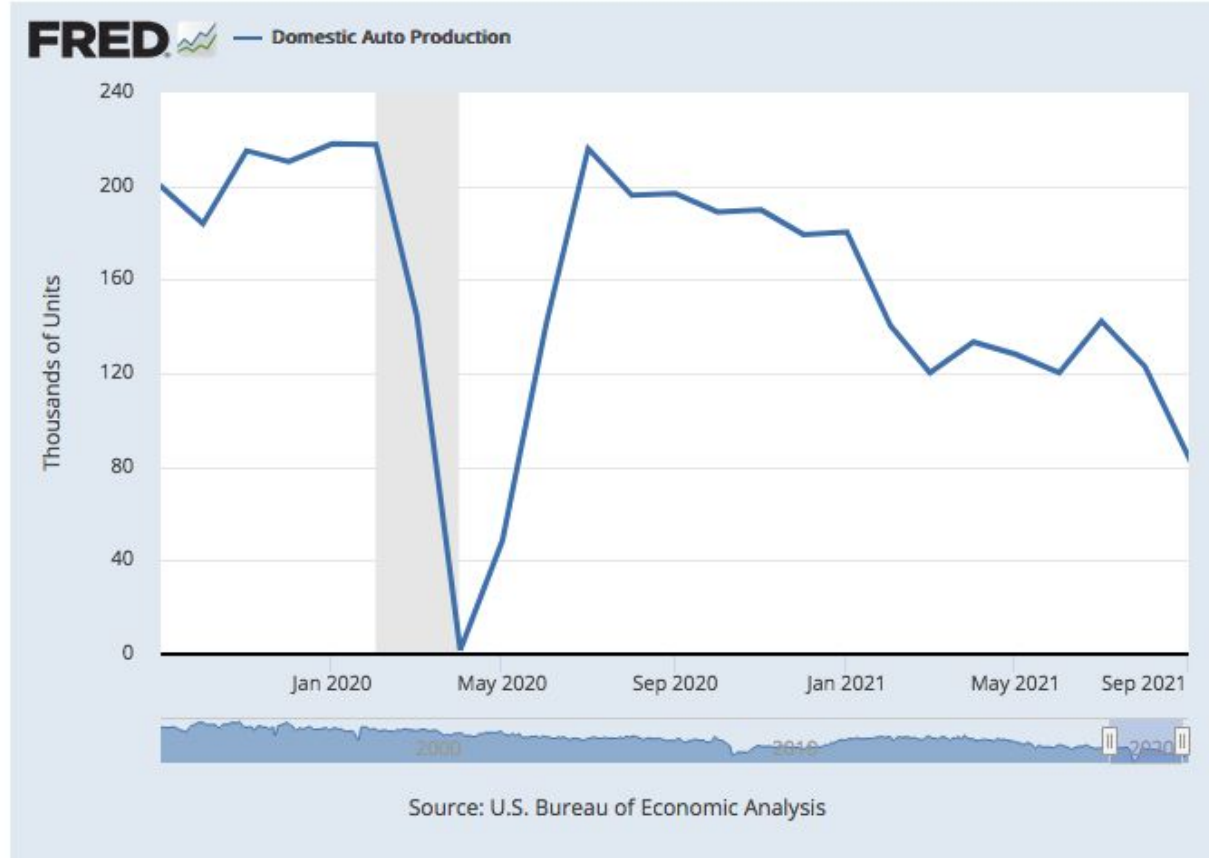


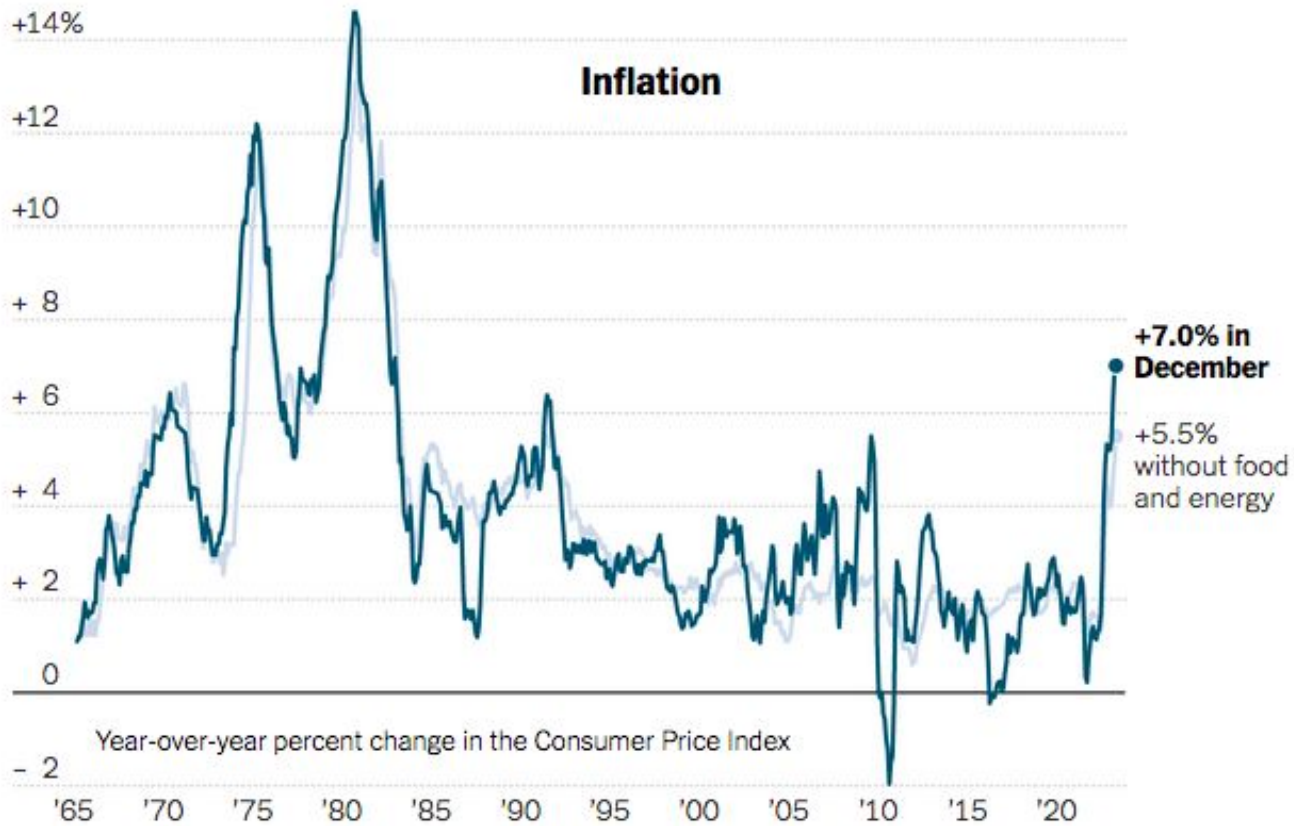
If yes, please specify the nature of the disruptions



Source: “From Microchips to Medical Devices. Semiconductors as an essential industry during the COVID-19 pandemic.” Semiconductor Industry Association. Fall 2020.

# Importance to Automobiles

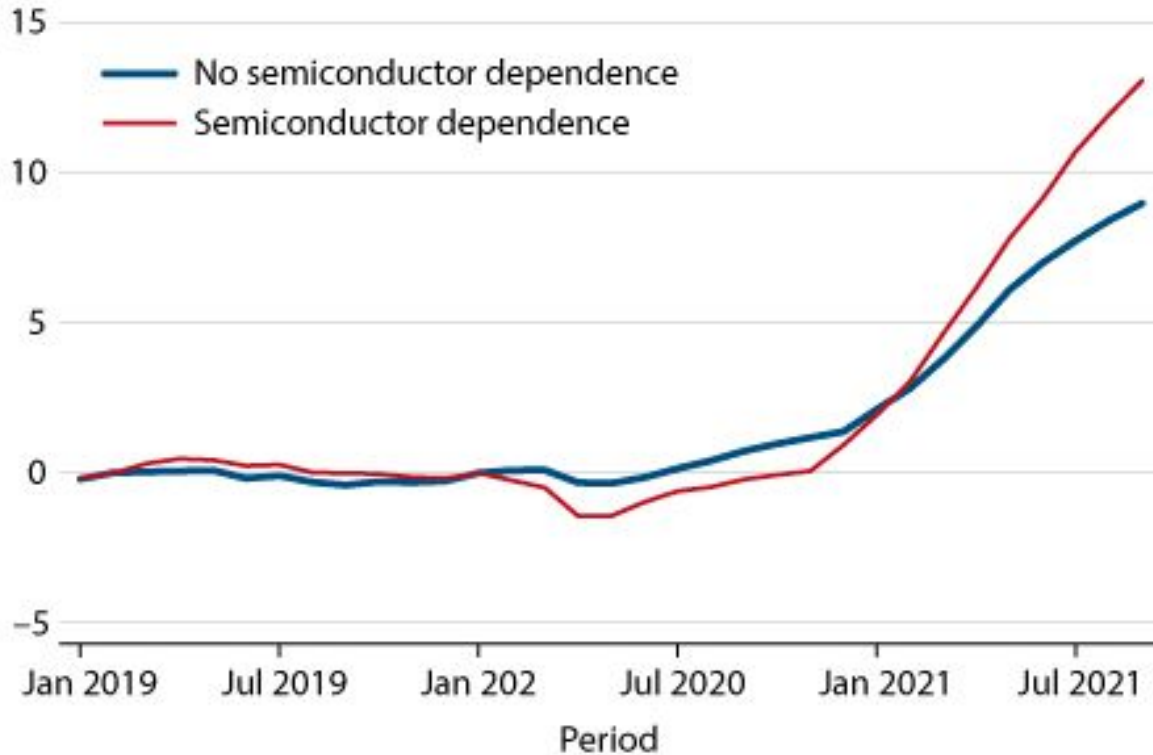




Source: Bureau of Labor Statistics • By Ella Koeze

## Price Changes in U.S. Manufacturing Industries

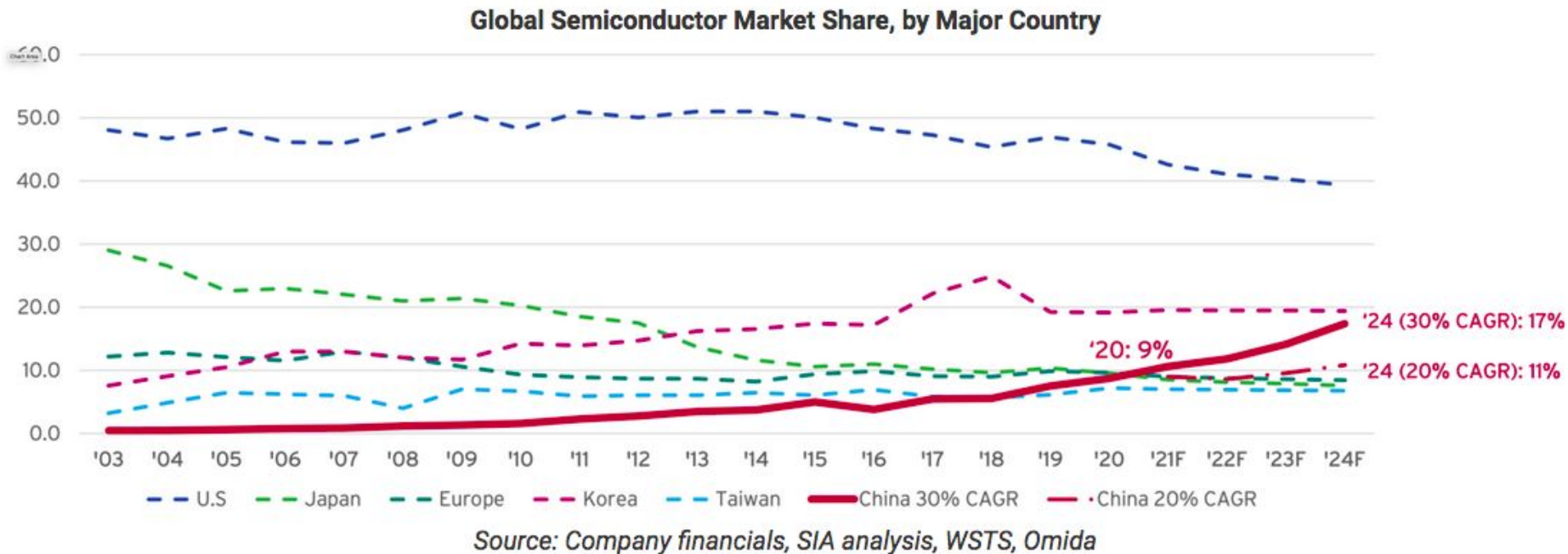
Average price change (%)



SOURCE: BEA, BLS, and authors' calculations.

# Semiconductor Industry

# Geographic Changes



# Semiconductor Foundries by Market Share

Company	Market share	Country
TSMC	54%	Taiwan 🇹🇼
Samsung	17%	South Korea 🇰🇷
UMC	7%	Taiwan 🇹🇼
GlobalFoundries	7%	U.S. 🇺🇸
SMIC	5%	China 🇨🇳
HH Grace	1%	China 🇨🇳
PSMC	1%	Taiwan 🇹🇼
VIS	1%	Taiwan 🇹🇼
DB HiTek	1%	China 🇨🇳
Tower Semiconductor	1%	Israel 🇮🇱
Other firms	5%	N/A



Company / Industry News

# Consolidation of Semiconductor Industry

## AMD acquiring Xilinx

- Deal announced October 2020
- All stock transaction valued at \$35 billion
- Delayed by regulatory review, now expected to close early 2022

## NVIDIA acquiring ARM

- Deal announced September 2020
- Deal valued at \$40 billion in cash and stock
- Delayed by regulatory review.

## Analog Devices acquired Maxim Integrated Products

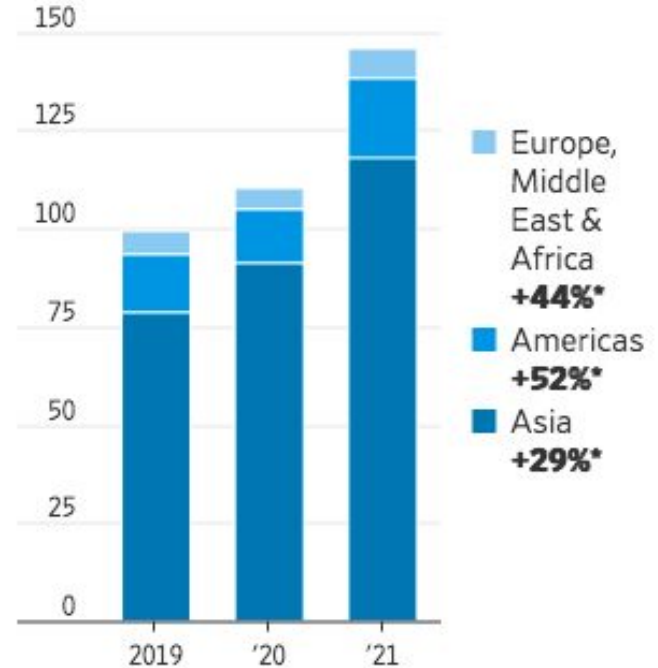
- Merger completed August 2021
- All stock transaction, valued at \$20 billion

# Increasing Capacity in U.S.

- Samsung: \$17 billion factory in Texas
- Intel: \$20 billion on two plants in Arizona and \$3.5 billion expansion in New Mexico.
- Taiwan Semiconductor Manufacturing Co: \$12 billion plant in Phoenix.
- Texas Instruments: \$30 billion for plants in Texas.

Global capital spending on semiconductors by region

\$175 billion



\*Projected change from 2020 to 2021

Note: 2021 projections are as of the third quarter

Source: Gartner

# Increased Capacity in U.S. Continued

## GlobalFoundries Inc.

- IPO: October 2021
- Supplies silicon-wafers. Customers include: Qualcomm, AMD, and Samsung.
- Has factories in: Singapore, the E.U., and the U.S.
- Was created as a spin-off from AMD in 2009
- Not yet profitable
- Mubadala Investment Co. - after IPO retains over 89% of the shares.

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Q&A

# Mark your calendar:

## GWII Show - Live with Rodney Lake

February 17 at 6:30 pm EST

March 17 at 6:30 pm EDT



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