Osher Lifelong Learning Institute, Winter 2022
Contemporary Economic Policy

Santa Clara University

Jon Haveman, Ph.D.
National Economic Education Delegation

NATIONAL ECONOMIC
EDUCATION DELEGATION

1

1

National Economic Education Delegation

- **Vision**
  - One day, the public discussion of policy issues will be grounded in an accurate perception of the underlying economic principles and data.

- **Mission**
  - NEED unites the skills and knowledge of a vast network of professional economists to promote understanding of the economics of policy issues in the United States.

- **NEED Presentations**
  - Are **nonpartisan** and intended to reflect the consensus of the economics profession.

NATIONAL ECONOMIC
EDUCATION DELEGATION

2

2

Who Are We?

- **Honorary Board: 54 members**
  - 2 Fed Chairs: Janet Yellen, Ben Bernanke
  - 6 Chairs Council of Economic Advisers
    - ○ Furman (D), Rosen (R), Bernanke (R), Yellen (D), Tyson (D), Goolsbee (D)
  - 3 Nobel Prize Winners
    - ○ Akerlof, Smith, Maskin
- **Delegates: 600+ members**
  - At all levels of academia and some in government service
  - All have a Ph.D. in economics
  - Crowdsource slide decks
  - Give presentations
- **Global Partners: 45 Ph.D. Economists**
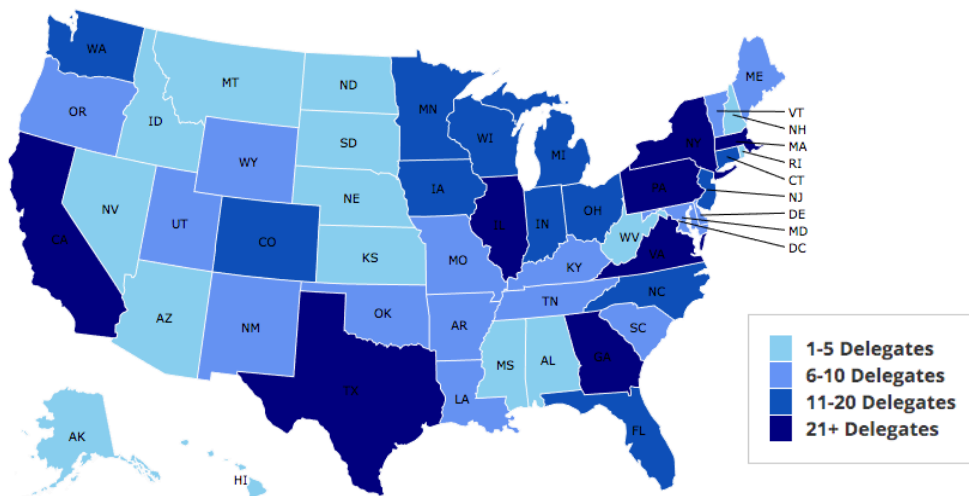 - Aid in slide deck development

**NATIONAL ECONOMIC
EDUCATION DELEGATION**

3

3

Where Are We?

**NATIONAL ECONOMIC
EDUCATION DELEGATION**

4

4

Course Outline

- **Contemporary Economic Policy**
  - Week 1 (1/5):   US Economy & Coronavirus Economics
  - Week 2 (1/12):   Climate Change Economics (Bevin Ashenmiller, Occidental College)
  - Week 3 (1/19):   Health Economics (Me)
  - Week 4 (1/26):   Economics of Immigration (Jennifer Alix-Garcia, Oregon St.)
  - **Week 5 (2/2):   Infrastructure Economics (Mallika Pung, Univ. of New Mexico)**
  - Week 6 (2/9):   The U.S. Safety Net (Marianne Bitler, UC Davis)

NATIONAL ECONOMIC
EDUCATION DELEGATION

5

5

Infrastructure Economics

Mallika Pung, Ph.D.
University of New Mexico

NATIONAL ECONOMIC
EDUCATION DELEGATION

6
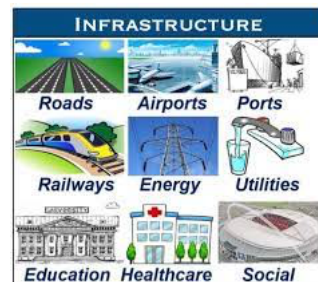
6

Submitting Questions

- **Please submit questions in the chat.**
- **We will do a verbal Q&A once the material has been presented.**
  - And the questions in the chat have been addressed.

NATIONAL ECONOMIC EDUCATION DELEGATION

7

7

Credits and Disclaimer

- **This slide deck was authored by:**
  - Mallika Pung, Rice University
  - Jon Haveman, NEED
- **Disclaimer**
  - NEED presentations are designed to be nonpartisan.
  - It is, however, inevitable that the presenter will be asked for and will provide their own views.
  - Such views are those of the presenter and not necessarily those of the National Economic Education Delegation (NEED).

NATIONAL ECONOMIC EDUCATION DELEGATION

8

8

Outline

- **What do we mean by infrastructure?**
- **Current state of infrastructure in the US**
- **Infrastructure in economic models**
- **Why should we invest in infrastructure?**
- **Policy options to fund infrastructure investments**

**NATIONAL ECONOMIC
EDUCATION DELEGATION**

9

What is a Useful Definition of Infrastructure?

- *Infra-* means "below;"
  - So, the infrastructure is the "underlying structure" of a country and its economy.
- Miriam-Webster definition of Infrastructure:
  - the system of public works of a country, state, or region
    - o *also***:** the resources (such as personnel, buildings, or equipment) required for an activity
  - the underlying foundation or basic framework (as of a system or organization)
  - the permanent installations required for military purposes

**NATIONAL ECONOMIC
EDUCATION DELEGATION**

10

10

Different Kinds of Infrastructure

- **Provide basic services**
- **Improve the performance of the economy**
- **Make people's lives better**
  - Example: Electricity, water, broadband, roads, bridges, airports, seaports

Another Categorization

- **Tangible**
  - Traffic systems: streets, railways, other transportation
  - Utilities and disposal: energy, water, and communication networks
- **Intangible**
  - Human capital
    - Education, research facilities
    - Health systems, social services
- **Institutional**
  - Legal, economic, and social system
  - Culture, traditions

Infrastructure – Is it:

- **Traditional:**
  - Roads, bridges, tunnels, airports, seaports, dams, water, electrical, and telephone systems?
- **Additional:**
  - Broadband
- **What about:**
  - R&D? Human capital? Institutions?
- **What definition of "infrastructure" makes it most useful today?**
  - Caregiving?

NATIONAL ECONOMIC EDUCATION DELEGATION

13

13

What is Infrastructure? – A Recap

- **Economic infrastructure:**
  - Basic services that represent a foundational tool for the economy.
  - Can be:
    - o Physical structures
    - o Systems
    - o Institutions
    - o Services
    - o Facilities
- **We will focus on physical structures, systems, and facilities.**

NATIONAL ECONOMIC EDUCATION DELEGATION

14

14

Categories of Physical Infrastructure

- **Transportation**
  - Highways, roads, bridges
  - Mass transit
  - Airports, seaports
- **Water**
  - Supply
  - Distribution
- **Waste management**
  - Trash, recycling, and wastewater

- **Energy**
  - Generation
  - Transmission
- **Communications**
  - Telephone
  - Internet

NATIONAL ECONOMIC EDUCATION DELEGATION

15

15

Current State of Infrastructure in the US

2021 Infrastructure Grades			
AVIATION	D+	PORTS	B-
BRIDGES	C	RAIL	B
DAMS	D	ROADS	D
DRINKING WATER	C-	SCHOOLS	D+
ENERGY	C-	SOLID WASTE	C+
HAZARDOUS WASTE	D+	STORM WATER	D
INLAND WATERWAYS	D+	TRANSIT	D-
LEVEES	D	WASTEWATER	D+
PARKS AND RECREATION	D+		

America's Cumulative Infrastructure Grade: **C-**

A EXCEPTIONAL
B GOOD
C MEDIOCRE
D POOR
F FAILING

NATIONAL ECONOMIC EDUCATION DELEGATION

16

Source: https://www.infrastructurereportcard.org/

16

8

Current State of Transportation Infrastructure

- **Roads**
  - Over 4 million miles of roads.
  - In 2018: 3.3 trillion VMT (Vehicle Miles Traveled).
  - 40%+ of America's urban interstates are congested.
  - In 2017, 8.8 billion hours of traffic delay.
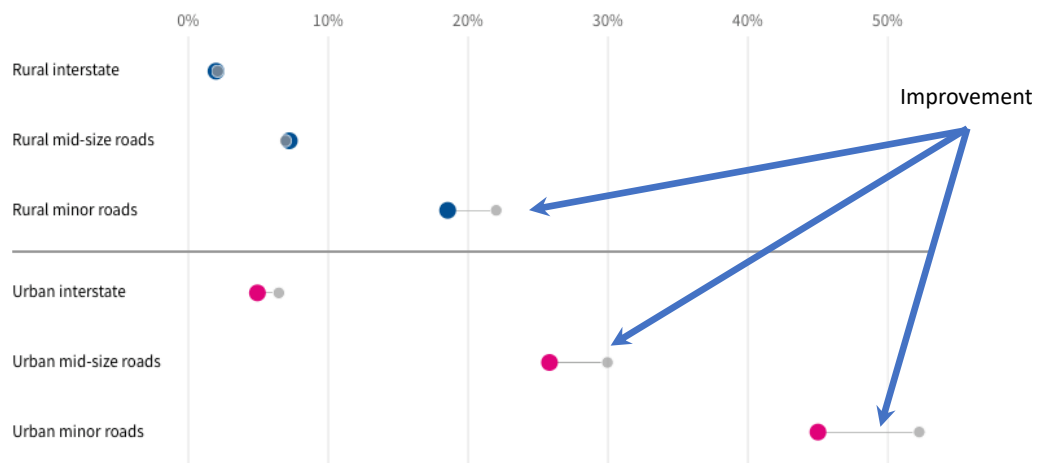   - Costing the country $166 billion in wasted time and fuel.

  "The average auto commuter spends 54 hours in congestion and wastes 21 gallons of fuel due to congestion at a cost of $1,080 in wasted time and fuel."
  -- 2019 Urban Mobility Report, Texas A&M Transportation Institute

  - 42,060 motor vehicle fatalities in 2020 (8% increase over 2019).

NATIONAL ECONOMIC EDUCATION DELEGATION

17

17

But it is Getting Better

Improvement

PERCENT OF ROADS IN UNSATISFACTORY CONDITION 2000 VS **2019**

	0%	10%	20%	30%	40%	50%
Rural interstate						
Rural mid-size roads						
Rural minor roads						
Urban interstate						
Urban mid-size roads						
Urban minor roads						

NATIONAL ECONOMIC EDUCATION DELEGATION

18

Source: usafacts.org

18

Current State of Transportation Infrastructure

- **Mass Transit**
  - ~ 6,800 organizations in the U.S. that provide transit services.
  - Transit ridership: peaked at 10.7 billion in 2014.
    - COVID-19 pandemic caused major disruptions across all transit agencies.
  - 45% of Americans have no access to transit.

  - 50% of passenger trips by bus.
    - 10% of fleets NOT in "state of good repair".
  - 33+% by heavy rail (subway/metro)
    - 3% of fleets NOT in "state of good repair".

Transit users face increased delays due to service interruptions, and agencies are grappling with growing maintenance and vehicle procurement costs.

NATIONAL ECONOMIC
EDUCATION DELEGATION

19

19

Current State of Transportation Infrastructure

- **Aviation**
  - In 2019, 10 million+ commercial flights
    - Flying ~3 million passengers daily
  - National Plan of Integrated Airport Systems (NPIAS)
    - identifies over 3,300 airports in the U.S. aviation network
  - Contributed 5.1% to US GDP
    - Generated 10.6 million jobs
  - In 2019, 79% of flights were on-time. Delays were caused by
    - late-arriving aircrafts,
    - air carriers,
    - weather, and
    - diverted flights.

NATIONAL ECONOMIC
EDUCATION DELEGATION

20

20

Current State of Transportation Infrastructure

- **Ports**
  - 99% of US overseas trade pass through ports
  - Los Angeles and Long Beach – busiest ports in the US
    - ○ Top 10 U.S. ports account for 3/4th of U.S. trade
  - Congestion decreased port productivity by over 25% over the past decade
    - ○ COVID-19 pandemic exacerbated the congestion related issues
  - Port infrastructure upgrades needed to accommodate new, larger ships with deeper navigation channels
- **Waterways**
  - More than 600 million tons of cargo
    - ○ 14% of annual domestic freight
  - Beyond their 50-year design life
  - 50% vessels experience delays due to maintenance shut downs

NATIONAL ECONOMIC EDUCATION DELEGATION

21

21

Current State of Water Infrastructure

- **Drinking Water**
  - 150,000+ public drinking water systems
  - 1 billion+ glasses of drinking water consumed daily
    - ○ 80% from surface waters such as rivers, lakes, oceans, reservoirs
    - ○ 20% from groundwater aquifers
  - Delivered via 2.2 million miles of pipes
    - ○ Majority laid in mid-20th century and are aging
    - ○ estimated 240,000 water main breaks occur each year
    - ○ 6 billion gallons of treated drinking water lost daily due to leaking pipes
      - could support 15 million households

NATIONAL ECONOMIC EDUCATION DELEGATION

22

22

Current State of Water Infrastructure

- **Wastewater**
  - 16,000+ wastewater treatment plants
    - o 1.3 million miles of public and private lateral sewers
  - Used by 80% of Americans
    - o Likely to serve 56 million more people by 2032
  - Structural failure, blockages, and overflows cause at least 23,000 to 75,000 sanitary sewer overflow events each year

**NATIONAL ECONOMIC
EDUCATION DELEGATION**

23

23

Current State of Water Infrastructure

- **Dams**
  - There are over 91,000 dams in the US providing:
    - o drinking water,
    - o irrigation,
    - o hydropower,
    - o flood control, and
    - o recreation
  - Most are privately owned
  - Average age – 57 years
  - By 2025, 7 out of every 10 dams will be over 50 years old
  - In 2019, there were 15,600 high-hazard potential dams

**NATIONAL ECONOMIC
EDUCATION DELEGATION**

24

24

Current State of Water Infrastructure

- **Levees**
  - A network of 30,000 miles of levees
  - Levees in the U.S. Army Corps of Engineers Levee Safety Program protect
    - over 300 colleges and universities,
    - 30 professional sports venues,
    - 100 breweries, and
    - an estimated $1.3 trillion in property
  - Built in the mid-20th century with an average age of 50 years, aging fast
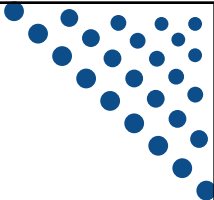 - Levees are crucial with majority of the U.S. population living within 50 miles of a coast

NATIONAL ECONOMIC EDUCATION DELEGATION

25

25

How Do We Compare?

Countries With The Best Infrastructure

Rank	Country	Infrastructure Score
1	Hong Kong	6.7
2	Singapore	6.5
3	Netherlands	6.4
4	Japan	6.3
5	United Arab Emirates	6.3
6	Switzerland	6.3
7	France	6.1
8	Korea	6.1
9	United States	6.0
10	Germany	6.0
11	United Kingdom	6.0
12	Spain	5.9

We're #9!

NATIONAL ECONOMIC EDUCATION DELEGATION

26

Source: World Economic Forum, [i]The Global Competitiveness Report 2017–2018[i]
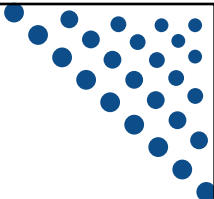
26

The 2021 Infrastructure Package

NATIONAL ECONOMIC
EDUCATION DELEGATION

27

27

What is in it?

• Transportation

Roads, bridges, major projects	$110 Billion
Passenger and freight rail	$66 Billion
Public transit	$39 Billion
Airports	$25 Billion
Port infrastructure	$17 Billion
Transportation safety programs	$11 Billion
Electric vehicles	$7.5 Billion
Zero and low-emission buses and ferries	$7.5 Billion
Revitalization of communities	$1 Billion

• Other

Broadband	$65 Billion
Power infrastructure	$73 Billion
Clean drinking water	$55 Billion
Resilience and Wester water storage	$50 Billion
Removal of pollution from water and soil	$21 Billion

NATIONAL ECONOMIC
EDUCATION DELEGATION

28

28

How is it paid for?

- **Unspent emergency relief funds**
- **Strengthening tax enforcement – crypto currencies**
- **Revenue generated from higher economic growth**
- **Increased federal budget deficit**

NATIONAL ECONOMIC
EDUCATION DELEGATION

29

29

Infrastructure Benefits

NATIONAL ECONOMIC
EDUCATION DELEGATION

30

30

Why Should we Invest in Infrastructure?

- **Vital ingredient to economic growth**
  - Facilitates economies of scale, raises productivity
    A 10% rise in infrastructure assets directly increases Real GDP per capita by 0.7 – 1%.

    - o Assuming increases in spending translate 1-1 to the stock of assets:
      - ~$50 billion will raise GDP per capita in the US by ~$300 -$450.
        - $**100 to $150 billion** in increased GDP.

    - o Productivity growth raises standards of living

NATIONAL ECONOMIC
EDUCATION DELEGATION

31

Why Should we Invest in Infrastructure?

- **Vital ingredient to economic growth**
  - Reduces trade costs by improving access to markets
    - o Port capacity improvement
    - o Reducing traffic congestion
  - Reduces effective distances, facilitates trade and agglomeration
  - Advances public health by providing clean water and effective sewage systems

NATIONAL ECONOMIC
EDUCATION DELEGATION

32

Case for Spending More on Infrastructure Maintenance

- **Rundown infrastructure increases costs**
  - Longer travel time → higher costs for businesses
  - Wear on cars → more spending on car repairs → faster car depreciation
  - Vehicle deterioration → Additional fuel consumption

  "The average motorist in the U.S. is losing $523 annually -- $112 billion nationally -- in additional vehicle operating costs as a result of driving on roads in need of repair."
  -- November 2016 Urban roads TRIP report

- **Deferred maintenance is a debt burden on the future generations.**

NATIONAL ECONOMIC EDUCATION DELEGATION

33

Infrastructure in economic models

- **Vast macroeconomic literature on relation between infrastructure and economic growth**
  - Neoclassical growth model aka the Ramsey Model

  - Endogenous growth model

  - Variants

- **Wide variation in the magnitude of economic effects of infrastructure spending on growth or productivity**

NATIONAL ECONOMIC EDUCATION DELEGATION

34

Econometric issues that make the task difficult

- **Direction of causality**
  - Between infrastructure investment and productivity
  - Between infrastructure investment and output
- **Spurious correlation**
  - Non stationary data
  - Ignoring unobserved factors that might affect both infrastructure investment and output
- **Heterogenous Effects**

NATIONAL ECONOMIC
EDUCATION DELEGATION

35

Public or Private Infrastructure Investment?

- **Nonrival consumption**
- **Non-excludable use**

➔ Social benefits might exceed expected financial return.
➔ Private sector likely to underprovide key types of infrastructure.
➔ Economic case for public provision of infrastructure assets.

NATIONAL ECONOMIC
EDUCATION DELEGATION

36

Public or Private Infrastructure Investment?

- **A few arguments for public provision:**
  - Provision of public infrastructure increases productivity of private infrastructure
    - o Incentivizes private capital investment,
    - o Increases labor productivity,
    - o Indirectly increases employment and wages.

NATIONAL ECONOMIC
EDUCATION DELEGATION

37

37

Public or Private Infrastructure Investment?

- **A few more arguments for public provision:**
  - Provides short-term stimulus to the economy by creating jobs
  - Promotes trade and commerce
  - Promotes equity
    - o Pays prevailing wages
    - o More demographically inclusive
    - o Encompasses all congressional districts
  - Promotes public health and well-being
  - Improves public safety
  - Affects not just the present but the future generations also

- **Some of these are more debatable than others**

NATIONAL ECONOMIC
EDUCATION DELEGATION

38

38

Empirical Evidence on Effect of Gov't Spending

- **In studies from 80s, early 90s:**
  - A 1% increase in the stock of public capital raised GDP by 0.39%
- **In more recent studies**
  - by only 0.08% in the short run, 0.12% long run
- **In terms of multiplier, most short-term estimates are less than 1**
  - Due to negative effects of tax/interest rate increases on private C and I
- **Longer term multiplier**
  - OECD panel data – 1.6
  - US interstate highway system – 1.8

NATIONAL ECONOMIC
EDUCATION DELEGATION

39

39

Empirical Evidence on Effect of Gov't Spending

- **Estimates from the 2009 American Recovery and Reinvestment Act**
  - Each $100,000 spent led to 0.8 job-years created
  - Highway construction employment unaffected in 2009-10
    - o fell sharply afterwards
  - Significant "crowd-in" of state and local highway spending
   - o For each $1 of federal grant and additional $2.30 in state spending

NATIONAL ECONOMIC
EDUCATION DELEGATION

40

40

A CBO study on effects of Gov't Spending on Infrastructure on Real GDP

- **Two scenarios to finance $500 billion over 10 years:**
  1. Reducing gov't noninvestment purchases
     - ○ *Reduces* net cost by 1/3rd
     - ○ Real GDP increase averages 0.09% between 2022-51
  2. Increasing federal borrowing
     - ○ *Increases* net cost by 1/4th
     - ○ Real GDP increase averages 0.04% between 2022-51

Increases in the Level of Real GDP

Percent
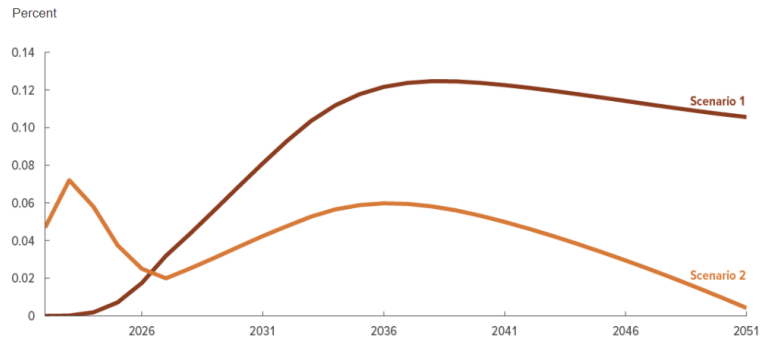
NATIONAL ECONOMIC
EDUCATION DELEGATION

41

41

Infrastructure Investment in the US

- **Transportation, drinking water, and wastewater infrastructure**
  - mainly funded by the public sector
- **Publicly owned transportation infrastructure**
  - Highways
  - Aviation
  - Rail
  - Mass transit
  - Water transportation
- **Publicly owned water infrastructure**
  - Water utilities
  - Water resources
- **In 2017, Federal, State and Local governments spent**
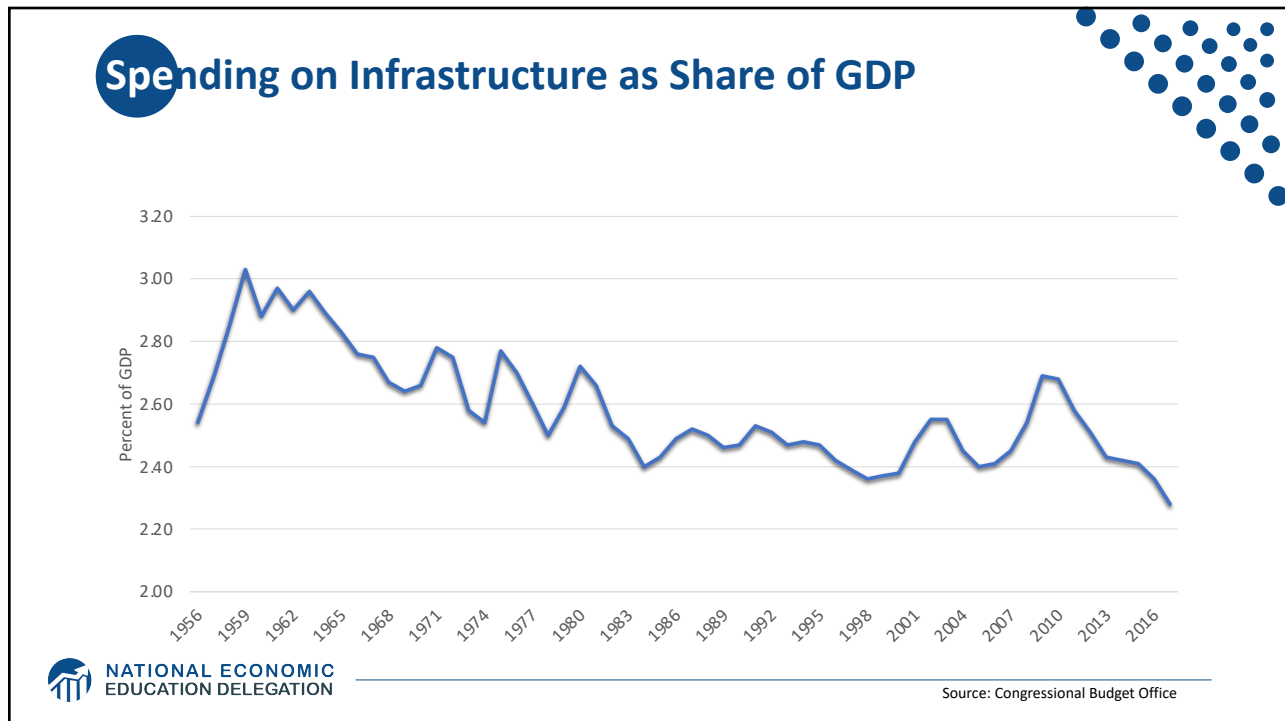 - $441 billion on infrastructure
  - 2.3% of gross domestic product
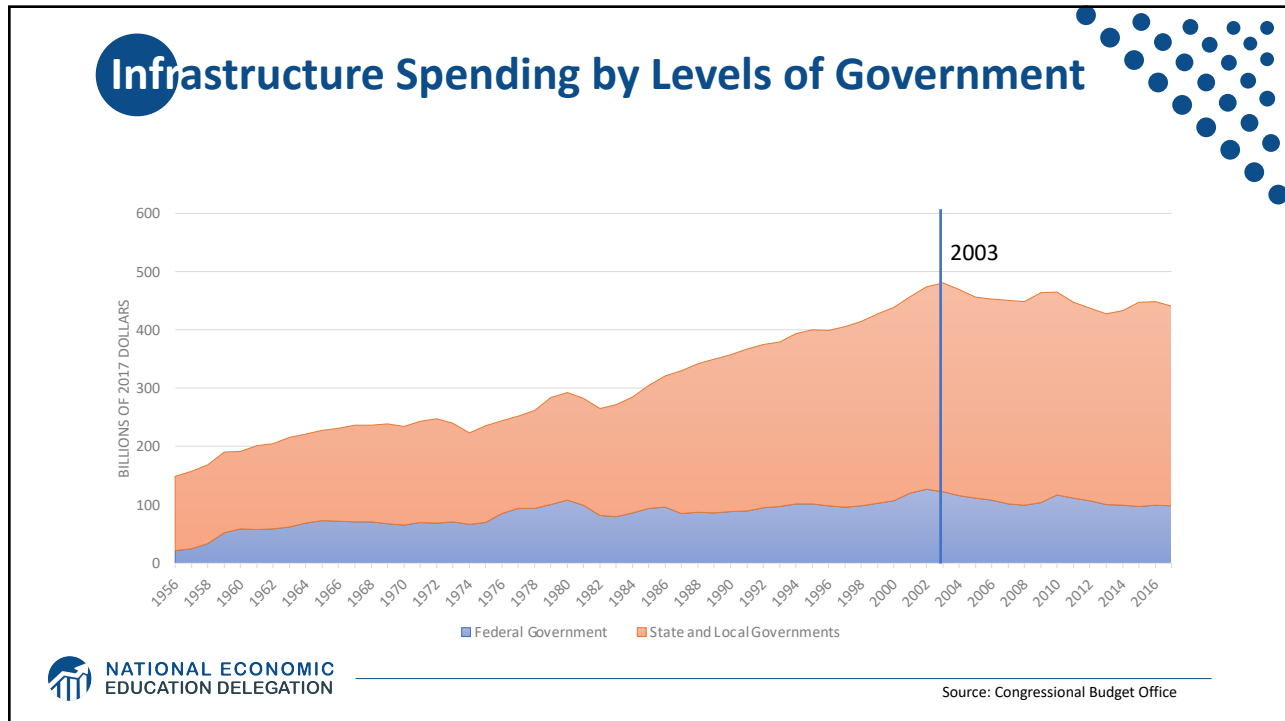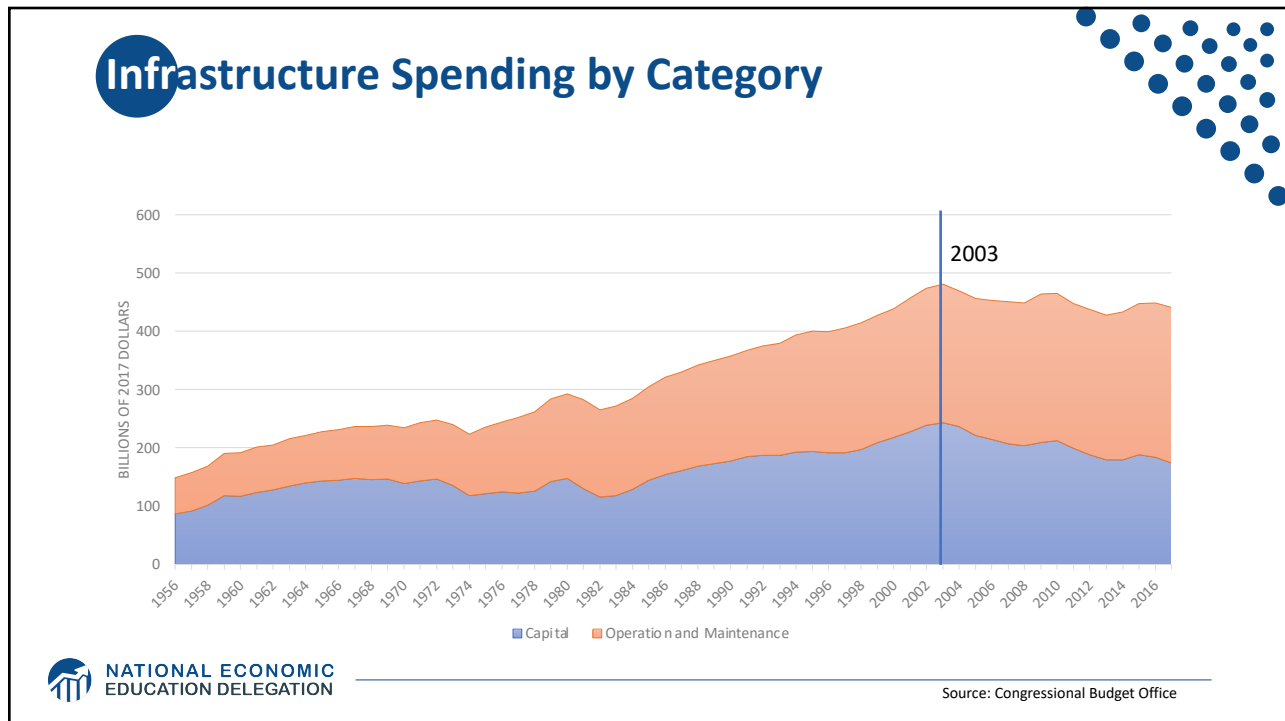
NATIONAL ECONOMIC
EDUCATION DELEGATION

42

Government Spending on Infrastructure, 2017

43

Spending on Infrastructure as Share of GDP

44

Infrastructure Spending by Levels of Government

2003

BILLIONS OF 2017 DOLLARS

■ Federal Government   ■ State and Local Governments

NATIONAL ECONOMIC
EDUCATION DELEGATION

Source: Congressional Budget Office

45

Infrastructure Spending by Category

2003

BILLIONS OF 2017 DOLLARS

■ Capital   ■ Operation and Maintenance

NATIONAL ECONOMIC
EDUCATION DELEGATION

Source: Congressional Budget Office

46

Spending by Category and Level of Gov't

Capital — Operation and Maintenance

Source: Congressional Budget Office
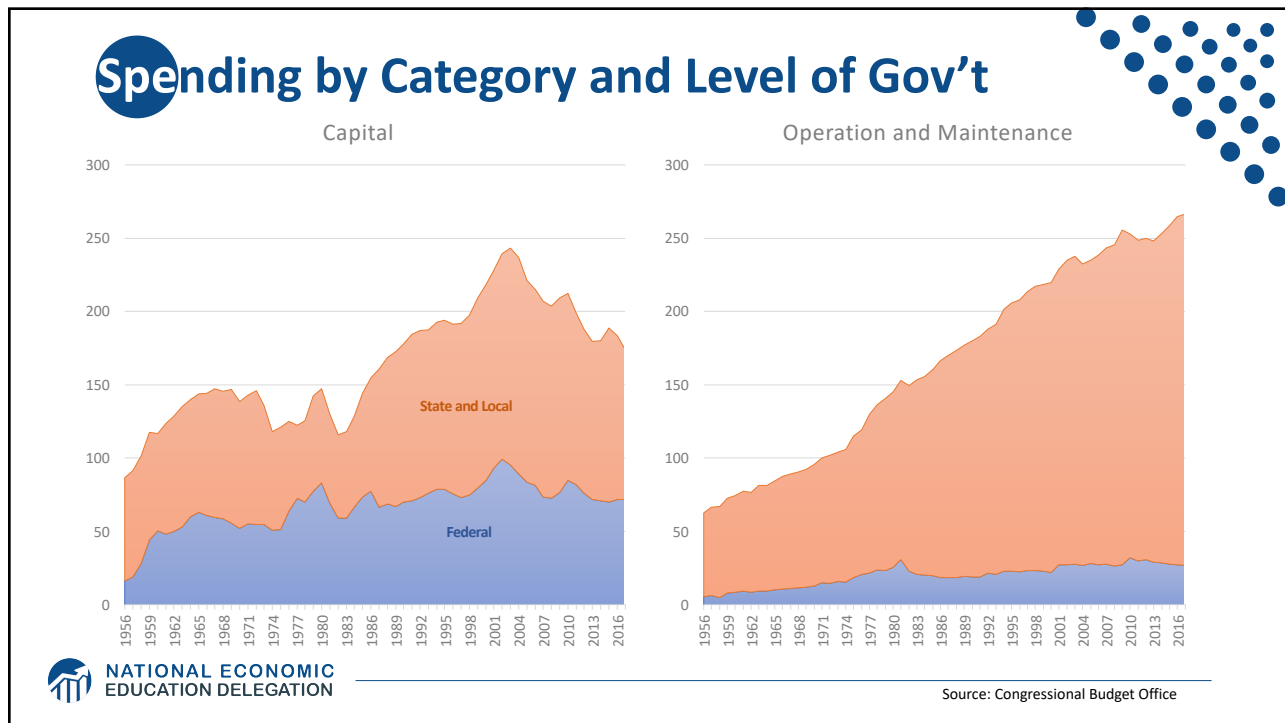
NATIONAL ECONOMIC
EDUCATION DELEGATION

47

Federal vs. State and Local Gov't Roles in Infrastructure Investment

Mode	Typical Maximum Federal Share of Total Spending	Decision making roles of Federal, State and Local Gov'ts
Highways	80% of capital	State and local gov'ts choose projects, following federal rules and conditions
Mass Transit	80% of capital, 50% of operations	State and local gov'ts choose projects, following federal rules and conditions
Rail	Not applicable	Regulatory
Aviation	75%-90% of capital	State and local gov'ts choose projects, following federal rules and conditions; Federal gov't designs the national aviation system
Water Transportation	40%-100% of construction, 50%-100% of operations	Federal gov't chooses water projects with Congressional approval

NATIONAL ECONOMIC
EDUCATION DELEGATION

48

Federal Support for State and Local Infrastructure

- **Federal government provides to state and local governments**

  - major financial support for highways, mass transit, aviation, and water utilities.

  - relatively little financial support for water infrastructure

NATIONAL ECONOMIC EDUCATION DELEGATION

49

Funding vs. Financing Infrastructure Investment

- **Funding**
  - Spending current resources
- **Financing**
  - Issue bonds to be repaid in future
  - Attractive option if government doesn't have funds now
  - Limits future availability of funds

- **1/3rd of public investment between 2007-16 involved federally supported financing.**

NATIONAL ECONOMIC EDUCATION DELEGATION

50

Sources of Federal Infrastructure Financing

- **Discretionary spending**
  - subject to appropriation
  - capitalization grants for state banks and
  - fund the net subsidy costs of direct federal credit programs

- **Direct spending**
  - authorization of mandatory spending
  - 2009-10 Build America Bonds program for transportation and water projects
  - future programs of tax credit bonds

- **Federal tax exemption for the interest paid on various bonds**

NATIONAL ECONOMIC
EDUCATION DELEGATION

51

Federal Financing of State and Local Infrastructure

- **50%+ state and local infrastructure spending financed through**
  - bonds that provide federal tax preferences or
  - federally supported loan programs
- **Examples:**
  - Tax exempt bonds ← Most widely used
  - State revolving funds and infrastructure banks (or state banks)
    - o Direct Loans -- loans made using banks' capital funds
    - o Leveraged Loans -- using the proceeds of bank issued tax-exempt bonds
  - Tax credit bonds
  - Direct federal credit programs

NATIONAL ECONOMIC
EDUCATION DELEGATION

52

Fiscal Substitution of Federal Infrastructure Investment

- A $1 increase in federal highway grants, reduces state and local spending by 20-80 cents.
- The effect will vary depending on
    - fiscal condition of state and local governments,
    - whether federal spending change is permanent or temporary,
    - magnitude of the spending change,
    - direction of the change

NATIONAL ECONOMIC
EDUCATION DELEGATION

53

53

What About Private Sector Investment?

- State and local governments own almost all of the nation's transportation and water infrastructure.

- Most of the private-sector investment in these occurs through public-private partnerships for publicly owned infrastructure.

NATIONAL ECONOMIC
EDUCATION DELEGATION

54

What Is a Public-Private Partnership?

- **Per Engel et al. (2011)**

  "an agreement by which the government contracts a private company to build or improve infrastructure works and to subsequently maintain and operate them for an extended period (for example, 30 years) in exchange for a stream of revenues during the life of the contract"

- New federal investment tends to favor new construction

- Traditional procurement separates design, construction and maintenance aspects

- Contractors involved in new construction not incentivized to build to minimize long term maintenance costs

- PPP helps correct this incentive problem.

NATIONAL ECONOMIC EDUCATION DELEGATION

55

Types of PPP contracts

- **PPP contracts differ based on the amount of risk transferred from the public to the private sector:**

  - Design-Build (DB)

  - Design-Build-Operate-Maintain (DBOM)

  - Design-Build-Finance-Operate-Maintain (DBFOM)

  - Similarly, we can have DBF, DBFM, etc.

NATIONAL ECONOMIC EDUCATION DELEGATION

56

Few Public-Private Partnerships in the US

- Colorado I-70 Project
- Denver FasTracks commuter and light rail project in Colorado,
- Goethals Bridge reconstruction project linking New York City and New Jersey
- Bayonne Water Joint Venture LLC project, a water and wastewater PPP in New Jersey
- Automated People Mover (APM) project at Los Angeles International Airport (LAX)
- LaGuardia Airport Terminal B P3 project

NATIONAL ECONOMIC EDUCATION DELEGATION

57

Few Public-Private Partnerships in the US

- A few unsuccessful P3s in California
  - Route 91 toll lanes in Orange County
  - Route 125 toll road in San Diego County
  - Presidio Parkway project connecting the City of San Francisco to the Golden Gate Bridge

NATIONAL ECONOMIC EDUCATION DELEGATION

58

An **Alternative Financing Tool – User Fees**

- **Make those who use infrastructure more heavily, pay for it.**
  - User fees help in appropriately rationing assets to the space.
  - Help in demand management where congestion is an issue

NATIONAL ECONOMIC
EDUCATION DELEGATION

59

An **Alternative Financing Tool – User Fees**

- **Singapore's congestion pricing model**
  - Singapore -- an island nation with land area of 250 sq. miles
  - Limited street capacity in the central business area
  - Heavy congestion
  - Electronic Road Pricing (ERP) System launched in 1998
    - o variable pricing designed to respond to congestion in real-time

  - Complementary policies to ERP
    - o Parking fees inside the restriction zone doubled
    - o Buses and bus frequency increased
    - o HOV+4 lanes established
    - o 15,000 park-and-ride spaces were established outside the restriction zone

NATIONAL ECONOMIC
EDUCATION DELEGATION

60

Another Aspect of Infrastructure – Broadband

- Talk of a digital divide ubiquitous
  - especially considering the current pandemic

- 21 million+ Americans lack meaningful access to the internet
  - Meaningful access: 25 Mbps download and 3 Mbps upload
  - 14.5 million have no access at all

- Lack of access more common among the less educated, low income, living in rural or suburban areas

- 9 million+ school children lacked internet access for online schoolwork

NATIONAL ECONOMIC EDUCATION DELEGATION

61

61

Broadband Access

- Modern-day equivalent of the interstate highway system

- Lack of access not just a rural problem
  - In 2016, 57% of households in Detroit, MI;
  - 49% in Memphis, TN and
  - 48% in Cleveland, OH without fixed broadband

- Digital redlining within cities

- Where available, service is often limited to a single service provider – natural monopolies
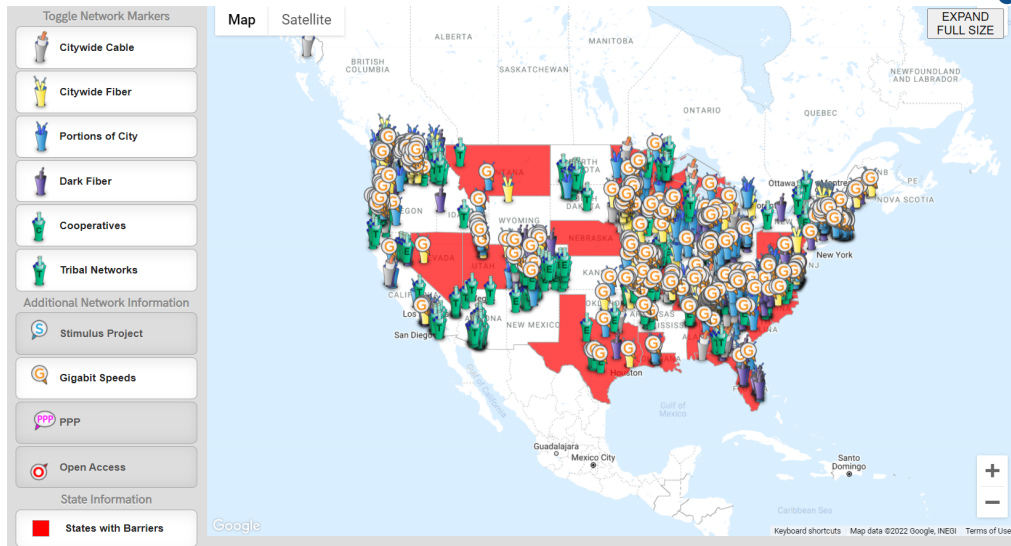 - Due to high up-front fixed costs of laying fiber optic lines

NATIONAL ECONOMIC EDUCATION DELEGATION

62

62

Solutions to the Access Problem

- 2021 Infrastructure Bill
- FCC Launched a $20 billion Rural Digital Opportunity Fund in February 2020
  - $6 million budget
  - Target census blocks that without 25/3 Mbps broadband
- Taking matters into their own hands, cities and communities:
  - Building municipal infrastructure and cooperatives providing broadband
  - Despite legal barriers or bans on publicly owned networks in 19 states
  - 850+ communities served by a municipal network or cooperative

  - Community-owned networks are less expensive and have more transparent pricing than private ISPs – Harvard Study

NATIONAL ECONOMIC
EDUCATION DELEGATION

63

63

Community Network Map

Source: https://muninetworks.org/communitymap

NATIONAL ECONOMIC
EDUCATION DELEGATION

64

64

Technological Advancements of the Future to the Rescue?

- Low Earth Orbit (LEO) satellite internet
  - On June 13, 2020 Elon Musk's SpaceX launched 58 satellites into low earth orbit as part of the Starlink program.
  - Aims to provide low-latency (less lag) satellite internet.
  - Better internet coverage than traditional communications satellites.
  - Could potentially provide high quality internet to homes and businesses without access to cable, fiber, or reliable cellular internet.

NATIONAL ECONOMIC
EDUCATION DELEGATION

65

65

Enormous Economic Benefits to Access

- **Individual benefits:**
  - Better health and life outcomes.
    - ○ Access to health and education online.
    - ○ Job search and development of digital skills.
  - Higher property values.
  - Increased population and job growth.
    - ○ Higher rates of business formation.

- **Broader economic benefits:**
  - World Bank
    - ○ 10% increase in access yields a 1.2% jump in real incomes.
  - Indiana
    - ○ ROI = 300-400%.

NATIONAL ECONOMIC
EDUCATION DELEGATION

66

Brookings; The Benefits and Costs of Broadband Expansion, Aug 18, 2021

66

Pace of Investment

NATIONAL ECONOMIC
EDUCATION DELEGATION

67

67

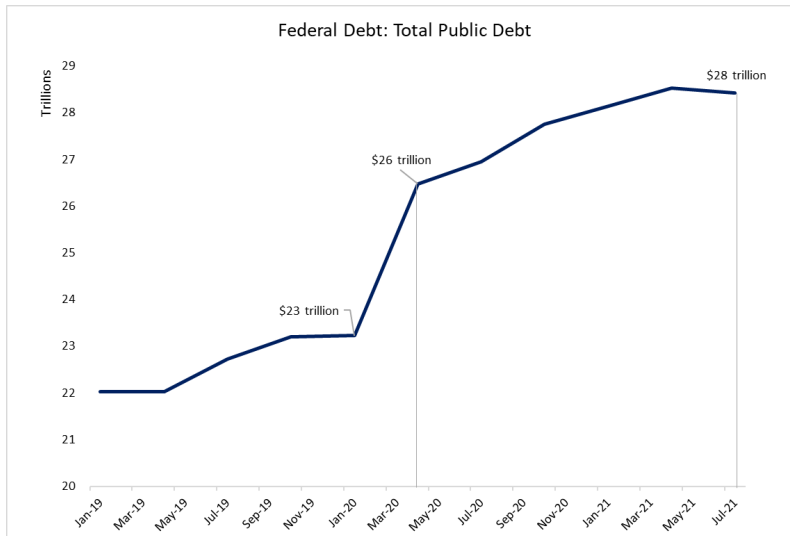# Too Much, Too Soon? Too Little, Too Late?

- **Is the current infrastructure package appropriate?**
- **The United States has enormous needs.**
  - Basic infrastructure – bridges, roads, etc.
  - Other:
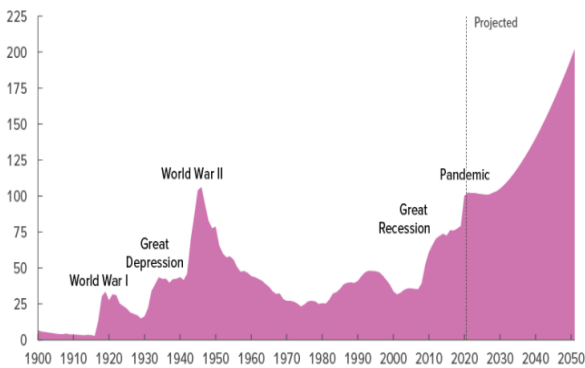   - General R&D: 2% of GDP in the 1950s, currently 0.75%.

NATIONAL ECONOMIC
EDUCATION DELEGATION

68

68

COVID Borrowing

69

Debt Outlook is Troublesome
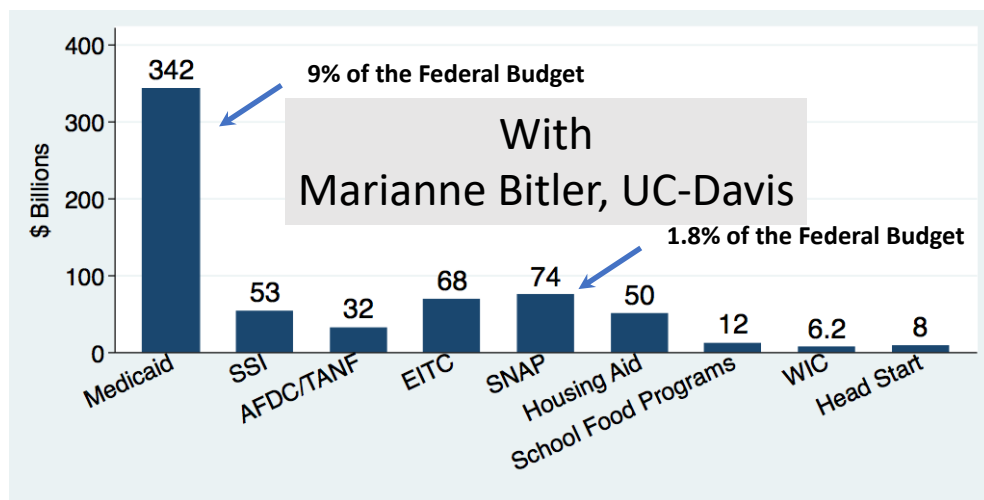

Source: Congressional Budget Office
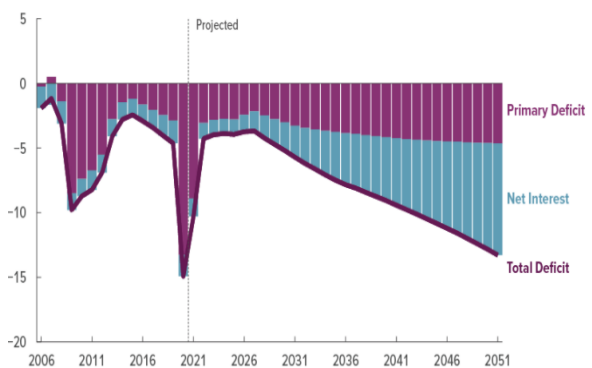
70

Summary

- **Infrastructure investment is important**
- **Current state of US infrastructure – leaves a lot to be desired for**
- **Public infrastructure investment can play a vital role in long run growth**
  - Improve mobility
  - Raise private capital productivity
  - Improve health
- **May not be ideal as short term stimulus**
- **Private sector involvement via the market process will promote innovation and efficiency**
- **Local access issues may sometimes be better resolved locally than federally**
  - Reforms needed to make the process less cumbersome

NATIONAL ECONOMIC EDUCATION DELEGATION

71

71

U.S. Safety Net Programs, Federal Expenditures 2014 or 2015

NATIONAL ECONOMIC EDUCATION DELEGATION

72

72

Thank you!

Any Questions?

www.NEEDelegation.org
Mallika Pung
MallikaPung@gmail.com

Contact NEED: info@NEEDelegation.org

Submit a testimonial: www.NEEDelegation.org/testimonials.php

Become a Friend of NEED: www.NEEDelegation.org/friend.php

NATIONAL ECONOMIC
EDUCATION DELEGATION

73

73