Small Business COVID Assistance Informational Session
“The Economics of the Pandemic and Social Distancing”

Presented by the
University of Wyoming
College of Business

May 12, 2020
College of Business Hosts

- Steve Farkas, Assistant Dean
Featured Experts

• Linda Thunström
  Assistant Professor of Economics

• Madison Ashworth
  Economics Graduate Student

• Stephen Newbold
  Assistant Professor of Economics

• Jason Shogren
  Stroock Chair, Professor of Economics

• David Finnoff
  Professor of Economics
Linda Thunström
Assistant Professor, Department of Economics
Consumption patterns during recessions

Consumption of…
• Durables decreases
• Non-durables stay relatively stable
• Services typically relatively stable – “great recession” broke that trend

This recession will have all of those, since they relate to loss of income, PLUS effects due to concerns about the virus (transactions are risky)
United States real durable and non-durable consumption, percentage change from year ago, base year=2012

Oct 1 2008: -13.5

March 1 2020: -11.3

"The great recession"
United States real (quarterly) service consumption, percentage change from year ago, base year=2012

Q2 2009: -0.6

“The great recession”

Q1 2020: -0.9
United States unemployment rate

April 2020: 14.7

“The great recession”
Real GDP dropped by -2.5% in 2009; the worst year for GDP during the “great recession.”

Source: The Conference Board, April 2020
Madison Ashworth
Graduate Student, Department of Economics
Total spending in Wyoming, Montana, Colorado and U.S.
Transportation spending in Wyoming
Healthcare spending in Wyoming
Grocery spending in Wyoming
Entertainment spending in Wyoming

-59.7% Wyoming
-71.4% USA
Restaurant and hotel spending in Wyoming
Consumer spending vs total cases in Wyoming

Confirmed coronavirus cases in Wyoming
5-09-2020

Percent Change in All Consumer Spending
Wyoming
Consumer spending and county variances

Percent Change in All Consumer Spending

VARIANCE TYPES
- Dining Variance
- Gathering Variance
- Dining & Gathering Variances
- More Restrictive Variances
- No Current Variances

AS OF 4:00PM, MAY 8, 2020
TO READ VARIANCES VISIT TINYURL.COM/WYOVARIANCES
What could get consumption going?

Income related factors:
• Maintained/increased income
• Reduced uncertainty about future income

COVID-19 related factors:
• Social distancing fatigue
• Safe transactions – if it’s not safe, many consumers won’t spend, and if it is safe, consumers need to know it. They also need to enjoy the “safe experience.”
Opportunities for Wyoming

- Living preferences might change – house over apartments; access to land and nature
- People might learn to like a slower pace of life
- The pandemic teaches firms and people how to work remotely – firms can cut costs by reducing office space and letting people work from home; people can skip time consuming commutes
- Wyoming has been relatively unaffected by the virus
- People might value low risk of virus transmission -- low air pollution and wind
Stephen Newbold
Assistant Professor, Department of Economics

[Image]
Integrating economics and epidemiology for policy analysis

basic epidemiological models + basic economics

\[ \text{policy insight and comparative policy assessments} \]

\textbf{Illustration: social distancing vs testing + self-quarantine in Wyoming}
SIR model with **social distancing**

The SIR model includes social distancing as a parameter. The model equations are:

- Transition from Susceptible (S) to Infected (I): 
  \[(1 - x)^2 \beta SI\]
- Transition from Infected (I) to Recovered (R): 
  \[\gamma I\]
- Transition from Infected (I) to Deaths: 
  \[\frac{\rho}{1 - \rho} \gamma I\]

The diagram illustrates the flow between the states: Susceptible (S), Infected (I), and Recovered (R) with the addition of death transitions.
SIR model with testing and self-quarantine

Susceptible $S$  \[ \beta SI \]  Infected $I$  \[ \gamma I \]  Recovered $R$

\[ \frac{\rho}{1-\rho} \gamma I \]  Testing \[ \frac{\rho}{1-\rho} \gamma Q \]  Quarantined

Deaths
Integrating economics and epidemiology for policy analysis

Assumptions:

- $R_0 = 2.4$
- $\gamma = 1/6.5$
- $VRR = $10 M$
- Price of test = $50$
- GDP loss proportional to distancing fraction or time in isolation + cost of tests
- Time to recovery = 5 years
- Discount rate = 3% per year
- Vaccine arrives in 12 months
SIR model with social distancing

Uncontrolled
5,200 deaths

\( x = 0.1 \)
263 lives saved
NB = $0.62 B

\( x = 0.21 \)
1,400 lives saved
NB = $3.0 B

\( x = 0.3 \)
3,500 lives saved
NB = $-11 B
SIR model with testing and quarantine

Uncontrolled
5,200 deaths

$\nu = 0.05$
1,100 lives saved
NB = $10 B$.

$\nu = 0.1$
3,100 lives saved
NB = $28 B$.

$\nu = 0.22$
5,000 lives saved
NB = $41 B$. 

$I$ as a function of $t$ [days]
Jason Shogren
Stroock Chair, Department of Economics
The Health and Economic Impacts of Nonpharmaceutical Interventions to Address COVID-19

A Decision Support Tool for State and Local Policymakers


Related Topics: Community Health and Well-Being, Coronavirus Disease 2019 (COVID-19), Economics, Epidemiology, Health Interventions, Labor Markets, Pandemic, Return-to-Work Programs and Policies
The Health and Economic Impacts of COVID-19 Interventions

STATE POLICY EVALUATION TOOL

Use this tool to:

Review updated public health and economic data by state

Model the social and economic effects of changing intervention levels

Evaluate best-practice guidelines for interventions

Compare other policy considerations for interventions
Interventions – WY is level 2

How Interventions Could Affect the Impact of COVID-19

The following projections aim to provide guidance on balancing the effectiveness of mitigation strategies with negative effects on the economy.

To estimate the projected effects of interventions, researchers developed an escalating scale of intervention levels, starting from a baseline of no restrictions and adding more-widespread restrictions at each level.

After an intervention ends, activity is assumed to return to an estimated “new normal” scenario. The new normal is relative to the strength of the intervention that has been in place, so populations that have been under a stricter lockdown are assumed to have less social interaction when restrictions are lifted.

- **No interventions**: No intervention and no reduction in activity.
- **Level 1**: Close schools.
- **Level 2**: Close schools, bars, and restaurants; and ban large events.
- **Level 3**: Close schools, bars, and restaurants; ban large events; and close nonessential businesses.
- **Level 4**: Close schools, bars, and restaurants; ban large events; close nonessential businesses; and issue a shelter-in-place order for the most vulnerable.
- **Level 5**: Close schools, bars, and restaurants; ban large events; close nonessential businesses; and issue a shelter-in-place order for everyone but essential workers.
- **New normal**: No intervention. Adjusted activity levels relative to the previous level of intervention.
Change to level 1 – close schools only (May 15th)
Cumulative fatalities (until Sept 1)

Location: Wyoming
Choose a location.

Wyoming

Current intervention level: 2
Wyoming currently has policies in place that most closely match a level 2 intervention.

New intervention level: 1
Choose an intervention strength.

New intervention start date:
May 15
Choose the date when Wyoming will move to intervention level 1. Assumes an end date of June 13 for all interventions.

Wyoming changing to level 1 from May 15
These charts show the projected outcomes of changing the intervention level for 30 days from the selected date, then returning to new normal.

Cumulative fatalities with selected intervention

Wyoming continuing at level 2
These charts show the projected outcomes of continuing the intervention level that mostly closely matches current interventions, then returning to new normal 30 days from the selected date.

Cumulative fatalities with current intervention

340 projected cumulative fatalities by September 1.

180 projected cumulative fatalities by September 1.
Change in Gross State Income
Total amount of money earned by a state’s people and businesses

income, a measure of the total amount of money earned by a state's people and businesses.

They show the projected effects of their respective interventions being in place for 30 days from May 15 and then returning to new normal.

<table>
<thead>
<tr>
<th>Wyoming changing to level 1 from May 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projected total change in gross state income from March 1 to June 13</td>
</tr>
<tr>
<td>-$315 million</td>
</tr>
<tr>
<td>Percentage change in annual gross state income</td>
</tr>
<tr>
<td>-2.4%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wyoming continuing at level 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projected total change in gross state income from March 1 to June 13</td>
</tr>
<tr>
<td>-$331 million</td>
</tr>
<tr>
<td>Percentage change in annual gross state income</td>
</tr>
<tr>
<td>-2.5%</td>
</tr>
</tbody>
</table>
Change to level 0 – everything is open (May 15th)

Location: Wyoming
Choose a location.

Current intervention level: 2
Wyoming currently has policies in place that most closely match a level 2 intervention.

New intervention level: No intervention
Choose an intervention strength.

No intervention start date: May 15
Choose the date when Wyoming will start having no interventions.

These charts show the projected outcomes of changing the intervention level for 30 days from the selected date, then returning to new normal.

Cumulative fatalities with selected intervention

57 days of interventions

Cumulative fatalities with current intervention

87 days of interventions

830 projected cumulative fatalities by September 1.

180 projected cumulative fatalities by September 1.
Change in Gross State Income

Current intervention level: 2
Wyoming currently has policies in place that most closely match a level 2 intervention.

New intervention level: No intervention
Choose an intervention strength.

No intervention start date: May 15
Choose the date when Wyoming will start having no interventions.

Wyoming changing to no intervention from May 15

Projected total change in gross state income from March 1 to June 13

-$217 million

Percentage change in annual gross state income

-1.7%

Wyoming continuing at level 2

Projected total change in gross state income from March 1 to June 13

-$331 million

Percentage change in annual gross state income

-2.5%

then returning to new normal.
David Finnoff
Professor, Department of Economics
## Who will take a free test?

<table>
<thead>
<tr>
<th>Age Category</th>
<th>Percentage willing to be tested</th>
<th>Percentage willing to be tested</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-34 (Low Risk)</td>
<td>80.77</td>
<td>77.45</td>
</tr>
<tr>
<td>35-54</td>
<td>69.14</td>
<td>70.12</td>
</tr>
<tr>
<td>55+</td>
<td>55.93</td>
<td>67.10</td>
</tr>
<tr>
<td>High Risk (65 +)</td>
<td>50.77</td>
<td>60.26</td>
</tr>
</tbody>
</table>

Vaccine avoidance & herd immunity

National sample (n=3,133)

- Intentions to vaccinate

Find that **20 percent** intend to decline the vaccine

- **Why?** General vaccine hesitancy, distrust of vaccine safety & vaccine novelty

- **Messaging:** Inconsistent risk messages from public health experts and the White House also reduce vaccine uptake

Can a vaccine get us to herd immunity?

Depends on:
• vaccine avoidance ($h$)
• vaccine effectiveness ($\varepsilon$)
• corona virus reproduction number ($R_0$)
• share of the population that is immune

**YES** if above & left of contour

**NO** if below and right
For **herd immunity** in WY:
- Need to vaccinate **58%** of population
  - *334,600*
- Best shot
  \[.6(1-.2)334,660 = 160,637\]
- Excess infections = **5,770**
- **10%** recovered needed for eradication
Questions

Please utilize the chat feature in Zoom for your questions and comments.

Please contact us at any time with comments and questions.

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   David Finnoff, e-mail: finnoff@uwyo.edu
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Department of Economics, University of Wyoming
Thank you for participating in today’s seminar.

Participants will receive an email with a link to an evaluation form and an opportunity to ask questions not covered in session.

A video of the session and an FAQ will be posted at www.uwyo.edu/business/covid-19/