STAR METRICS institutions are representative of the whole

STAR METRICS institutions come from a wide range of institutions.

This range includes schools with $1M in annual federal research awards (typical for the population as a whole). It also includes leading research universities with more than $100M in annual federal R&D funds.

Together, SM institutions accounted for 25% of $40B total federal R&D expenditures at universities in 2011.
**STAR METRICS** is a new measurement of STEM workforce

**STAR METRICS** is different than the HERD Survey

[HERD: Higher Education Research and Development Survey, NSF/NCSES]

- **STAR METRICS** shows more individuals supported by federal funds
- **STAR METRICS** shows a different composition of jobs

Estimated differences are **not** an artifact of sample selection

- SM/Other institutions show the same relationship to HERD data
- SM institutions show a different relationship with SM data

**STAR METRICS** provides more information about graduate, undergraduate, and other researchers in the STEM pipeline

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STAR METRICS data are rich, complex, and largely untapped.

Data permit numerous model specifications that require significant exploration.

Institution-level analysis does not use all available information:
- Analysis at the award/individual/research network levels
- Links to research outputs such as publications, patents, innovations, firm creation.
Are SM universities representative?

![Kernel density estimate](image)

<table>
<thead>
<tr>
<th>Year 2011</th>
<th>N</th>
<th>Federal R&amp;D Funding ($M)</th>
<th>Sum ($M)</th>
<th>% of HERD Total (est. $40,765M)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Median</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>SM Institutions</td>
<td>63</td>
<td>41.9</td>
<td>162.1</td>
<td>216.3</td>
</tr>
<tr>
<td>HERD Institutions ($1M+)</td>
<td>800</td>
<td>2.5</td>
<td>49.9</td>
<td>133.2</td>
</tr>
</tbody>
</table>
Differences in Measurement (I)

STAR METRICS usually identifies more individuals supported by federal awards at each institution than HERD.

Totals are presented as logarithms; differences are big at high levels.

Caveat: SM measures all faculty, HERD measures PI and co-PI faculty; but effect is similar for postdoc individuals.
Differences in Measurement (II)

Blue dots (•) are Star Metrics institutions; red circles (○) are non-Star Metrics institutions

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Differences in Measurement (II)

HERD data for SM and non-SM institutions exhibit the same relationship between R&D expenditures and individuals (statistically identical slope, level).
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Blue dots (•) are Star Metrics institutions; red circles (o) are non-Star Metrics institutions.

STAR METRICS data exhibit a more sensitive relationship to changes in federal R&D (slope, level are different, p>.99).

HERD data for SM and non-SM institutions exhibit the same relationship between R&D expenditures and individuals (statistically identical slope, level).
Differences in Measurement (III)

Composition of scientific workforce supported by federal R&D

• SM Postdoc employment per $100k is higher;
• SM ‘Other’ employment per $100k is lower.
• Remember: SM sample drawing from higher-funded institutions
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