Annual Integrated Economic Survey (AIES)

Federal Economic Statistics Advisory Committee (FESAC) December 2021
Project Background

• The Census Bureau requested the Committee on National Statistics to review our portfolio of annual economic surveys.

• Economic Directorate leadership assessed the recommendations and determined the scope.

• The end result of this large-scale effort will be a new program called the Annual Integrated Economic Survey (AIES).
Drivers of this Effort

- Meet data needs – timely, granular, standardized
- Improve efficiency – consistency across programs (content, processes, systems)
- Stay relevant
- Declining budgets
- Declining response rates
- Industry focused
- Overlapping content
- National estimates
- Independent samples
- Different reporting units by program
- Inefficient processes and operations
- Varying classification systems

- Single source of truth for a company
- Continuous two way updates from surveys

- Alignment to enterprise programs
- Respondent centric
- Rotating content
- Coordinated collection and instruments
- Harmonized reporting units
- Targeted, coordinated sample
- National and state estimates
- Fully leverage alternative data
- Consistent classification systems
- Blended data products
Key AIES Improvements

• Holistic Approach
• Coordinated Sample
• One Data Collection and Instrument
• Modular Design
• Sub-national level data for Retail, Wholesale and Services
• Expanded product data (available for Retail, Wholesale, and Services)
• Common Systems and Tools
• Common Release Schedule
Annual Program Requirements

• Helped to shape the new integrated annual survey

• Evaluated existing requirements for the individual in-scope surveys
  o Decided which requirements to keep
  o Standardized requirements across trades, where possible
  o Determined necessary modifications

• Developed new, overarching requirements, as needed

• Updated as Sampling Team develops comprehensive sample design
Annual Program Requirements include:

• **General requirements and working assumptions**
  • Overview of the survey
  • Frequency of collection
  • Coordinated sample
  • In-scope trades/data items/NAICS levels
  • Classification systems

• **Guidelines**
  • Administrative data
  • Government-operated establishments
  • Nonemployer coverage
Annual Program Requirements include (cont):

Industry coverage

• Align across the annual programs
  • Different NAICS levels for national and subnational estimates

• Geography
  • National
  • Divisional/Regional
  • State

• Sampling requirements/reliability constraints (CV)
  • Core Business Statistics
  • Products (secondary)
Product Release

For AIES we plan to release:

• **Core Business Statistics**, which will include data for common program items at detailed NAICS levels

• **Geographic Area Statistics**, which will include:
  • For Retail, Wholesale and Services, estimates for revenue, payroll and employment for selected states and balance of region at a consistent NAICS level

• **Product Statistics**, which will include:
  • NAPCS broad lines for select trades/industries

• **Miscellaneous Subjects**
  • Industry specific items at the national level at detailed NAICS levels
Current Work

• Continue to negotiate and work through program requirement obstacles

• Identify data items needed for bridge or reconciliation purposes

• Standardize variable names and align with the economic census where possible

• Continue to work with internal and external stakeholders
Future Goals & Milestones

- Determine AIES sample size
  - Balance accuracy and availability of subnational estimates with workload constraints

- Determine feasibility of producing nonemployer estimates for manufacturing and wholesale

- Eliminate the use of non-standard NAICS across all trades and data items

- Identify NAICS publication levels for “select” 5- and 6-digits

- Develop economy-wide data products planned for publication
Content Harmonization

• **Purpose of the content team:** Review existing survey content for the in-scope surveys and harmonize for collection in the integrated annual survey. In order to do this, started by:

  • **Making high-level recommendations on content**
    • Built content repository
    • Assigned topics and sub-topics to all existing content
    • Identified and documented stakeholder needs and uses of annual data

  • **Identifying content for each of the topic-based modules**
    • Standardized and harmonized content
    • Collaborated with framework team
    • Starting point for development and testing
Draft Modules and Topics

• Module 1
  • Business Classification
  • Business Characteristics
    • Operational Status
    • Organizational Change
  • High-level Company Totals
  • Collection Process

• Module 2
  • Detailed Revenues
  • Products
  • Detailed Expenses

• Module 3
  • Assets
  • Liabilities
  • Inventories
  • Capital Expenditures

• Module 4
  • All other topics not previously covered
Research To Date

• Conducted a record-keeping study to see how businesses maintain their books and get a better idea of data accessibility

• Carried out a coordinated collection pilot, consolidating contacts and communication within companies in multiple in-scope surveys
Next Steps for Content

• **Test our content**
  • Conduct cognitive testing and a Pilot Survey in 2022

• **Prepare to process the data**
  • Determine program requirements and systematic solutions, leveraging latest technology

• **Align content with other programs**
  • Use sound data management principles to standardize variable names to align across programs, including the Economic Census
Next Steps for Content
Time Series Evaluation

We are evaluating on an item-by-item basis any changes to content between AIES and the current programs.

• Plan is to evaluate each item separately to determine impact

• AIES Product Team will compare proposed publication series to historical ones and determine any necessary mitigation strategies

• Once we have a full list of series changes and proposed mitigation strategies together, will begin discussion with internal and external stakeholders
Frame Background

- Build a list of employer business units from the Business Register (BR) for use for AIES sampling research that meet program requirements

- Include content from the BR and the Economic Census needed for the AIES sample and subsequent processing activities

- Review existing methods used to create inputs to the sampling frame:
  - Align where possible to common methodology
  - Understand and document unique constraints
  - Develop list for future research/action

- Establish a production process
Frame Accomplishments & Current Work

• **Completed:**
  • Developed Frame prototype using latest BR data
    • Currently being used for the sampling team for research

• **In Progress**
  • Refinement of frame based on input from sampling team
  • Delivery of updated production frame targeted for November 2022
Sampling Design Requirements (Totals)

National

• Revenue/receipts, Annual Payroll, Inventories, Capital Expenditures...

• Disaggregated industry (NAICS) levels
  • Differs by sector
  • 4-digit NAICS, 5-digit NAICS, 6-digit NAICS

Subnational (Geographic)

• Revenue/receipts, Annual Payroll, 1st Quarter Employment

• Aggregated NAICS levels (3-digit, 4-digit)
  • “Direct use” states (meet target reliability for Annual Payroll)
    • 26 states
    • Allocated within region
  • “Balance” of region category for non-direct use states
Sampling Unit = Company

**Option 1:** Sample multi-industry company in one industry

- Collect roster data
  - Company lists all industries
  - Company reports for all industries

- Sampling issues:
  - Bias in industry-sampling stratum (overrepresentation)
  - Bias in other industries (underrepresentation)

**Option 2:** Create more than one artificial sampling unit for each company, with each sampling unit representing expected proportion of activity in industry

- Collect industry-specific data

- Sampling issue:
  - Spurious allocation leads to bias!
Current Decision: Sidestep Both Options

• “Complexity” determines initial certainty status

<table>
<thead>
<tr>
<th>Company operates in</th>
<th>Number of Sectors</th>
<th>Number of Industries*</th>
<th>Number of States</th>
<th>Status</th>
<th>Sampling Weight</th>
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<td>Certainty</td>
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<td>1</td>
<td>2+</td>
<td>Noncertainty</td>
<td>&gt; 1</td>
</tr>
</tbody>
</table>

* 4-digit NAICS industry
**Sectors 44, 45, 62

• The designated certainty units are excluded from sampling
# Targeted Direct Use States

<table>
<thead>
<tr>
<th>Region</th>
<th>Northeast</th>
<th>Midwest</th>
<th>South</th>
<th>West</th>
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<tbody>
<tr>
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<tr>
<td></td>
<td></td>
<td>Wisconsin</td>
<td>Texas</td>
<td>Virginia</td>
</tr>
</tbody>
</table>

| Allocated | 5 | 7 | 8 | 6 |
| Total     | 9 | 12 | 16 | 13 |
Sampling Team Accomplishments

• Developed end-to-end high level skeleton survey design using drafted Annual Program requirements provided
  • Sampling unit is the company
  • Annual Payroll is the measure of size variable
  • Initial stratification criteria
    • Assessed establishment counts by NAICS and state to determine feasibility of producing publishable state-level estimates
    • Refinements may be needed depending on strata counts and strata allocations
  • Power allocations
  • Probability proportional to size (PPS) sampling
    • Inclusion probabilities designed for multi-purpose design

• Determined sample selection procedure
  • Stratified sequential sampling (Chromy method)
Sampling Team Current Work

• Winsorization procedure (under development)
  • Prevent overly-large weights
  • Designed to minimize sampling variance

• Develop end-to-end sampling code for research (under development)
  • Propose alternative AIES sample sizes

• Incorporate indicator sampling design

• Determine frequency of sample

• Assess response burden
  • May consider rotation options/time-in-sample constraints
Still to determine...

- Collection Instrument Requirements
- Data Processing and Analysis System/Tools
  - New edits required
  - Imputation methodology to be developed
  - Estimation/weighting (national and subnational estimates)
  - Variance estimation
- Data Disclosure Avoidance
- Detailed Dissemination Plan
Challenges

• Establishing the appropriate collection unit
• Determining which processing system to use since current in-scope surveys process data in different systems
• Conducting the pilot
• Availability of enterprise solutions
• Adequate resources and competing priorities
• Inability to recycle current methodology
## Key Tasks/Deliverables

<table>
<thead>
<tr>
<th>Key Task/Deliverable</th>
<th>Planned Timeframe</th>
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<tbody>
<tr>
<td>Conduct cognitive testing</td>
<td>Oct. 2021 – Mar. 2022</td>
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<tr>
<td>Complete the pilot survey</td>
<td>Jan. – Dec. 2022</td>
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<tr>
<td>Deliver production frame methodology and programs</td>
<td>Sept. 2022</td>
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<tr>
<td>Finalize instrument requirements</td>
<td>Oct. 2022</td>
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<tr>
<td>Obtain the sample</td>
<td>Jul. - Aug. 2023</td>
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<tr>
<td>Perform usability testing</td>
<td>Jul. - Aug. 2023</td>
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<td>Receive production-ready instrument</td>
<td>Dec. 2023</td>
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<td>Mail the Annual Integrated Economic Survey</td>
<td>Jan.-Mar. 2024</td>
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<tr>
<td>Release new products</td>
<td>2025</td>
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THANK YOU

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