

PRASC



**Project for the Regional
Advancement of Statistics
in the Caribbean**

**Projet régional pour
l'avancement de la statistique
dans les Caraïbes**



In partnership with

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Introduction to sampling for business survey

Project for the Regional Advancement of Statistics in the Caribbean (PRASC)



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Anne-Marie Côté
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Sampling Plan

- A sampling plan consists of 3 components
 1. Sample design
 2. Estimation procedures
 3. Estimation of precision



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What does a sample design consist of?

- Population
- Frame
- Survey units
- Sample size
- Stratification /Sample allocation
- Sample selection method



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What is a population?

- Units about which information is sought
- Defining characteristics of the units
- Location of the units
- Time period under consideration



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Types of populations

- Target population:
 - Population for which information is required
- Survey population:
 - Population actually covered by the survey



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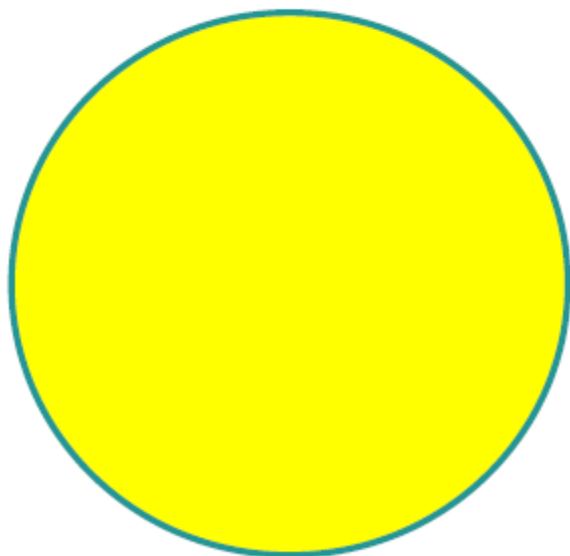
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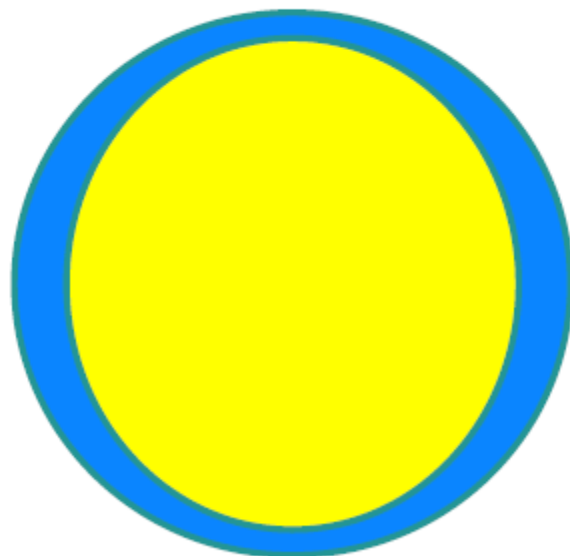
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Population Coverage

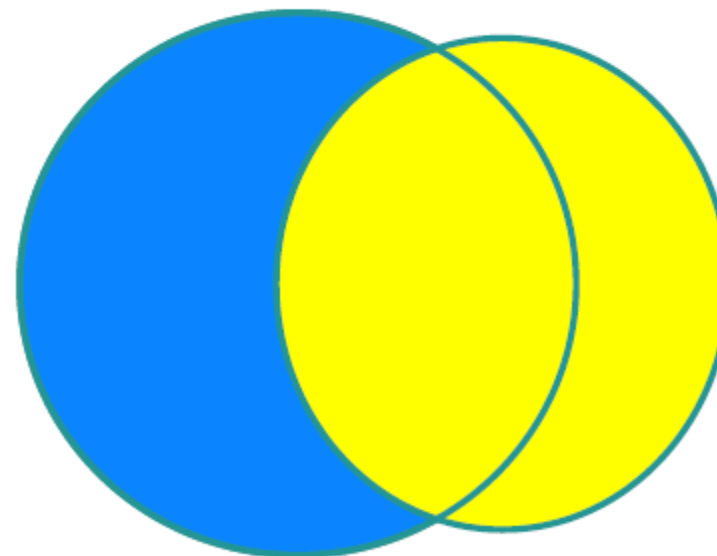
Ideal



Typical



Bad



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What is a frame?

- A frame is a list of elements that:
 - Covers the units of the survey population
 - Provides effective means of access to the units
- A frame is a vital component in the survey process
 - Defines the population to be surveyed
 - Provides information needed to
 - Define the sample plan
 - Select the sample
 - Contact selected units





Types of Frames

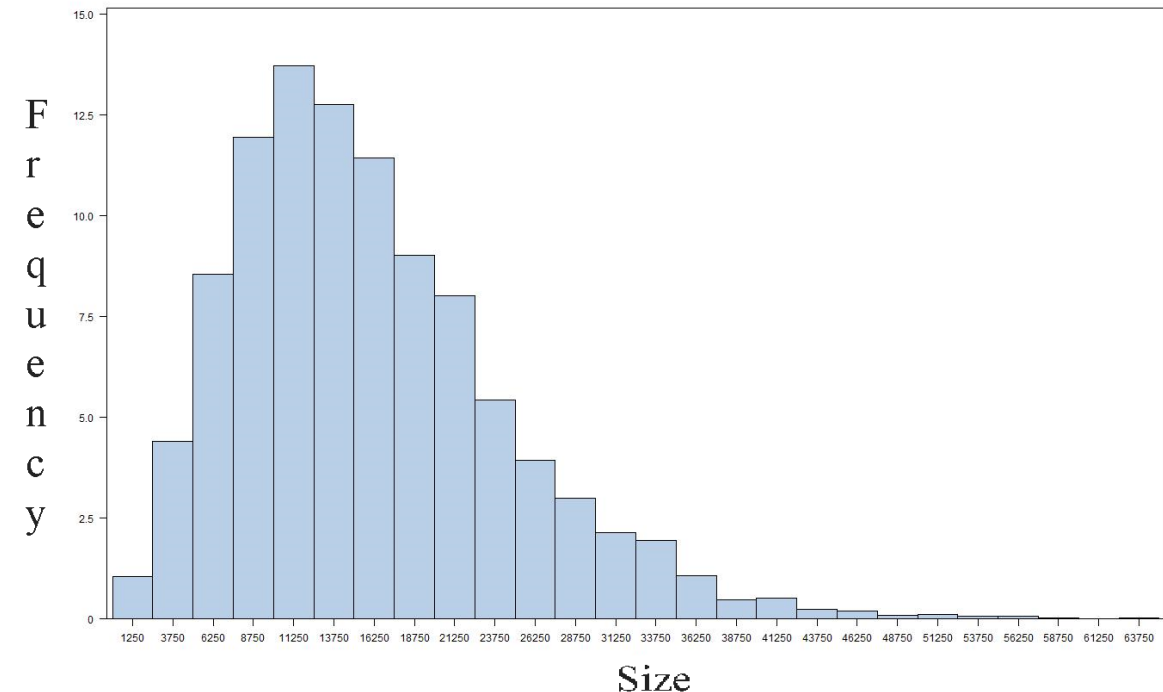
- List frame
 - A list of units in the population
- Area frame
 - A set of geographic areas from which areas are selected and associated units are contacted
 - Can be used for informal sectors but more often used in household surveys
- Business surveys almost always use list frames
 - Available from central BR in most cases
 - More efficient designs and cheaper collection methods



Features of Business Frames

- Skewed nature of population
 - Usually a few dominant businesses
 - Typically a small percentage of units account for the majority of economic activity

90% of activity -> 10% of the population





Features of Business Frames

- Business structures
 - At what level should we sample?
 - What level should we contact?
 - How do we classify a complex business?
- Industry dimension
 - SNA usually needs estimates at the industry level



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Types of Survey Units

- Sampling Unit
 - Unit to be selected
- Unit of Analysis
 - Unit to which inferences are directed
- Unit of Reference
 - Unit about which information is being obtained
- Respondent Unit
 - Unit providing the data





Features of Business Statistical Unit

- Usually enterprise or establishment level
- Characteristics of enterprises
 - Autonomy with respect to financial and investment decision making
 - Authority to allocate resources for production of goods and services
 - Level at which financial and balance sheet accounts are maintained
 - From which international transactions, an international investment position and the consolidated financial position can be derived
 - Can own and control one or more establishments





Features of Business Statistical Unit

- Characteristics of establishments
 - Management responsibility for production operations
 - Engages in a principal economic activity but may also engage in secondary activities
 - Usually can provide information on operating revenues, operating costs and detailed commodity inputs and outputs
- Financial surveys typically target the enterprise level as its statistical unit, while production surveys typically target the establishment



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Sample Size

- Sample size depends on:
 - Level of precision wanted
 - Variation between units
 - Population size
 - Budget
 - Time
 - Anticipated Non Response Rate



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Stratification

- Stratification is the division of a population into homogeneous, mutually exclusive groups called strata
- Allows us to ‘control’ outputs at specified levels:
 - Stratification should be closely aligned to the level of detail that we will publish
- Samples selected independently in each stratum.



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Stratification variables

- What do we stratify on?
 1. Geography (districts or parish)
 2. Industry (manufacturing, wholesale, transport,...)
 3. Size (employment, revenues, expenditures)



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Stratification variables

- Stratification on geography and industry
 - Do not necessarily obtain big gains at the overall level
 - Can insure reasonable quality of data for geography by industry cells
- Third variable is critical
 - Distribution of variables of interest will be quite skewed
 - Few large units account for a large portion of the variable of interest
 - Need to split them into size strata based on skewed variable (employment, sales)



Stratification variables

- Size stratification: Meet variance (quality) targets with a smaller sample.
- Size measure should be strongly correlated with variables of interest.

Unit ID	Selected	Weight	True Revenue	Estimation Contribution
1	Yes	5/3	10 000	16 667
2	Yes	5/3	20 000	33 333
3	Yes	5/3	500	833
4	No	0	200	
5	No	0	100	
Total		5	30 800	50 833



Stratification variables

- Size stratification: Meet variance (quality) targets with a smaller sample.
- Size measure should be strongly correlated with variables of interest.

Unit ID	SBR Size	Selected	Weight	True Revenue	Estimation Contribution
1	9 000	Yes	$2/2 = 1$	10 000	10 000
2	15 000	Yes	$2/2 = 1$	20 000	20 000
3	800	Yes	$3/1 = 3$	500	1 500
4	400	No	0	200	
5	400	No	0	100	
Total	25 600		5	30 800	31 500



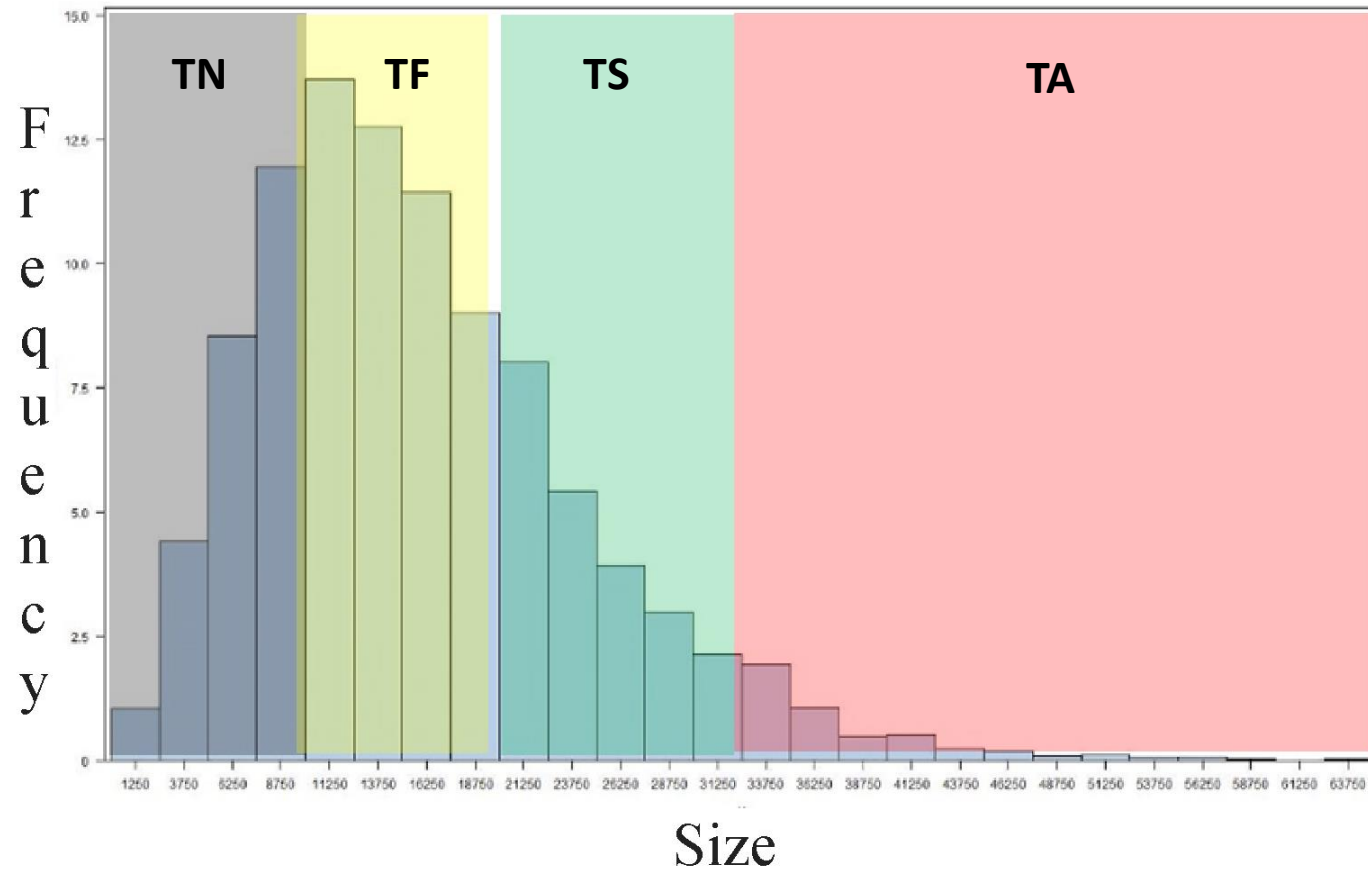
Stratification on size

- Stratify the population within each geo/industry stratum into
 - Take-all stratum (TA)
 - Largest units: Sampled with certainty
 - Take-some stratum or several take-some strata (TS, TF)
 - Smaller units : Sampled using simple random sampling
 - Take-none stratum (TN)
 - Smallest units : No units are sampled



Stratification on size

After stratification





Summary

- Things to consider when developing a sampling plan
 - Variable of interest
 - Single variable or multiple
 - If multiple, which variables are most important?
- Domains of interest
- Are there auxiliary data available which could be used to improve the sample plan?
 - Are there auxiliary data which are related to the variable(s) of interest?



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Quote...

One day, I'll go visit Theory.

Because in Theory, everything goes so well...





You can contact the PRASC team at:
statcan.prasc-prasc.statcan@canada.ca

