

# Japan's New Survey of Asset Discards from Corporate Accounts

-Revision of Capital Measurement in Japan-

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# Outline

## Capital Measurement in Japan

- Depreciation rates ( $\delta$ ) used in the current JSNA
- Some Empirical Evidence of ASL and  $\delta$  in Japan

## Survey on Capital Expenditure and Disposals (CED)

- Questionnaire and asset classification
- Some preliminary findings

## Future Plans

# Terminologies used in this presentation

(following OECD Capital Manual(forthcoming) and Triplett(1997))

## Capital Stock

- GCS: Gross Capital Stock
- PCS: Productive Capital Stock
- NCS: Net Capital Stock (=Wealth Capital Stock)

## Age-profiles of assets

- Deterioration (combined with discard and decay)
  - :Age-Efficiency Profile of a cohort of assets
- Discard (=retirement, scrapping)
  - :Disposal=discard + sales of used assets for continued use in production
- Decay (loss of efficiency of a surviving asset)
  - :Age-Efficiency Profile conditional on the survival of the asset
- Depreciation
  - :Age-Price Profile of a single asset
  - :Age-Price Profile of a cohort of assets

# Average Service Life(T) and Depreciation Rate( $\delta$ ) in the Current JSNA Net Capital Stock

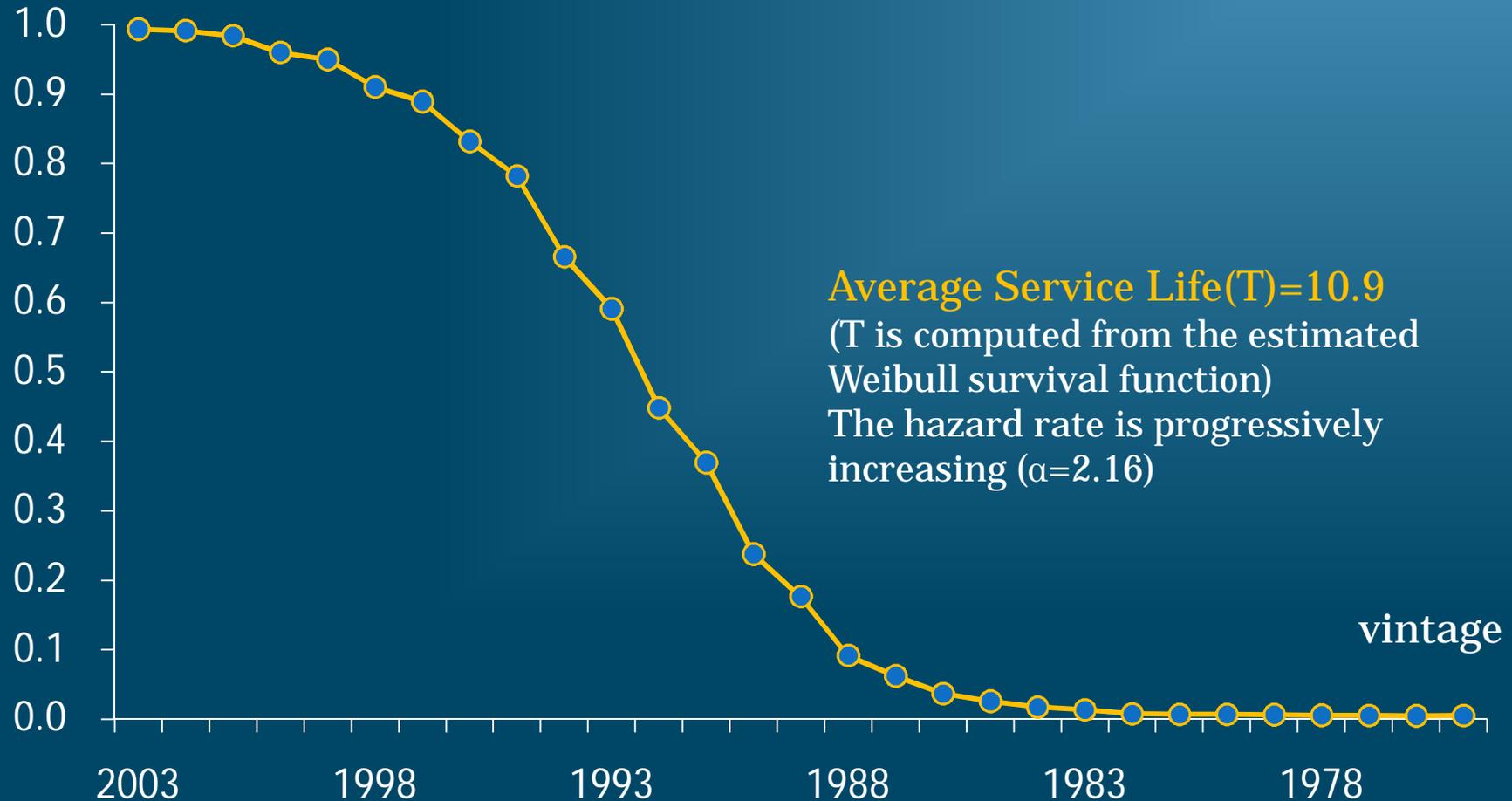
## – Too high $\delta$ ?

- Only seven tangible assets and software
- Straight-line for infrastructure and software and geometric approach for other assets
- Constant rates of depreciation used in JSNA-NCS are computed based on **the tax-lives in the 1970 Japanese National Wealth Survey** and stock-weight at that time.

By Assets	T	$\delta$	NCS
Dwellings	28.0	7.9	251163
Non-residential buildings	37.4	6.0	250712
Other structures	33.7	6.6	190913
Transportation equipment	7.6	26.2	26332
Agriculture machinery	9.2	22.2	2902
Other machinery	10.6	19.5	175055
Cultivated assets	5.4	12.1	1674
Total	27.8	9.9	898749

NCS: net capital stock at the end of 2000 (billion yen). The stocks depreciated by straight-line (infrastructure and software) are excluded in this table. (Nomura and Futakami, 2005)

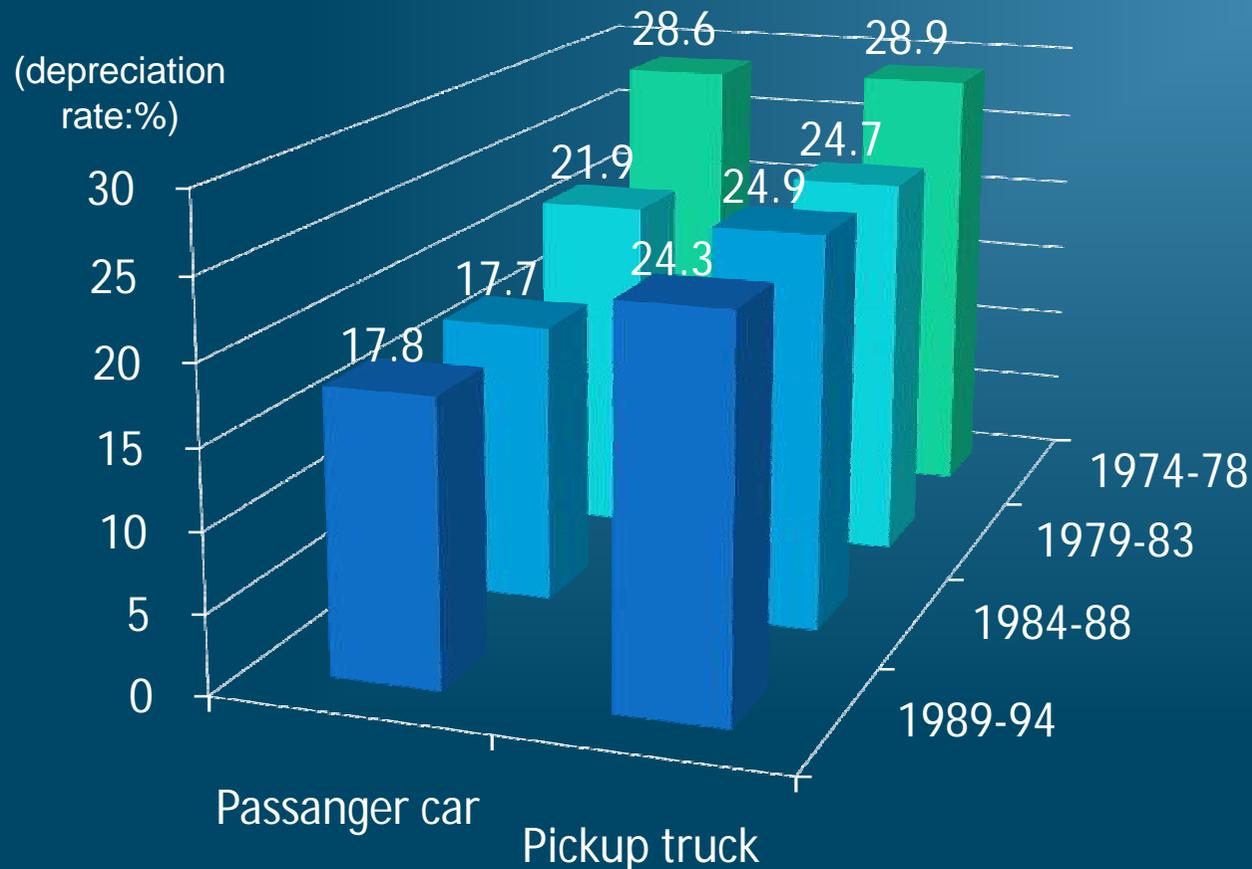
# Observed Actual Survival Rate in 2004 : Based on Registration Data of Passenger Cars



Observed actual survival rates as of the end of March 2004: based on the registration data covering all passenger cars in Japan (about 42 million) in Nomura (2005)

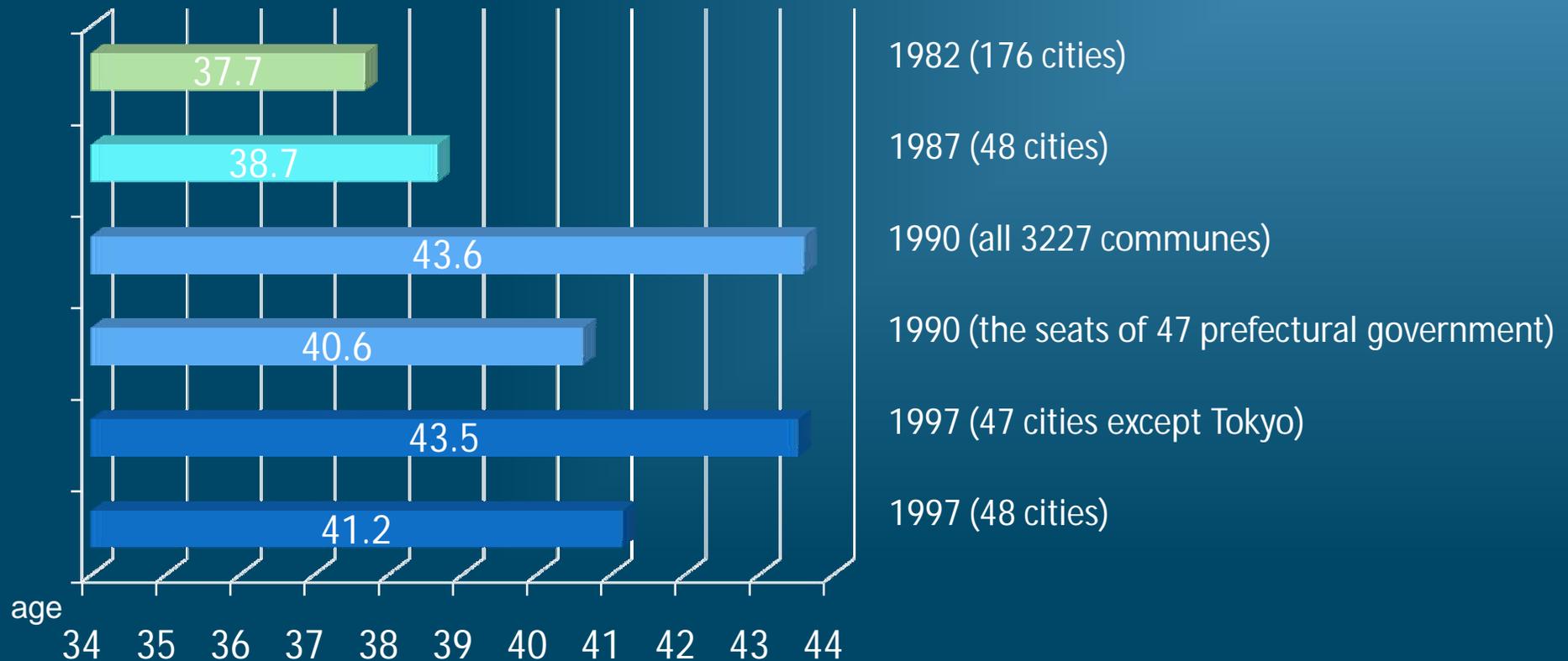
# Vehicles Lives are getting longer

: Based on the Second-hand Market Prices



Estimates of geometric depreciation rates for motor vehicles (following the Hulten-Wyckoff, Ohta-Griliches): based on the second-hand market prices during 1974-94 in Japan. Three physical characteristics (displacement, maximum shipping weight and horse power) and company dummy variables are controlled. (Nomura, 1997)

# Dwellings Owned by Household Live Longer : Based on Administrative Records



Estimates of Average Service Life that is defined as an age reaching 50 percent survival rate: based on the registration data of wooden dwellings in Japan. The covered cities differ among their four investigations. (Komatsu, 2000)

# Empirical Evidence in Japan

- Some empirical evidence in Japan finds that  $\delta$  assumed in the current JSNA may be too high (ASL is too small) for some assets.
- There are considerable differences of depreciation rates among countries: In Japan, it is obvious that dwellings have much shorter service lives, in comparison with that in the U.S. On the other hand, motor vehicles have longer service lives in Japan (maybe reflecting less utilization).
- Registration data and market price data: Only few assets (e.g. transportation equipment) are registered. Also, the availability of price data of aged assets in market is limited (e.g. second-hand, rental, insurance and so on).
- Need to obtain more empirical evidence at the detailed asset level

# Japan's New Survey on Capital Expenditure and Disposals

- *Survey on Capital Expenditures and Disposals of Private Enterprises* (CED)
  - A preliminary survey was implemented in 2003.
  - Based on the examination of this preliminary survey, we improved the questionnaire. Also, we could refer questionnaires in the *Survey on Capital and Repair Expenditures* by Statistics Canada.
- Properties of CED
  - Point in time for survey: conducted from the end of 2006 to the beginning of 2007 (corporate accounts for FY2005 (in principle, from April 2005 to March 2006.))
  - Survey subjects: about 133,000 private corporations that have a capital of 30 million yen or more
  - Survey objects: 30,000 corporations from the survey subjects
  - Response rate: 12,173 corporations (40.6%)
  - Questionnaires: capital & repair expenditure, financial lease, and disposals
  - Industry classification : JSIC 2-digit (although classified by enterprises)

# CED Questionnaire on Disposals

Please pick up 15 arbitrary assets and <b>write down each asset individually</b> (please do not aggregate same type of assets).		asset code #####	...	...
1. Name of asset (name of each asset in as much detail as possible so that its contents can be understood clearly)				
2. Period of acquisition	1.Year			
	2.Month			
3. Asset type at the period of purchase of the asset: 1. new acquisition, 2. acquisition of used goods, or 3. renovation and improvement	1.New			
	2.Used			
	3.Renovation			
4. Acquisition cost at the period of purchase of the asset				
5. Period of disposal	1.Year			
	2.Month			
6. Sold or scrapped at the period of disposal	1.Sold			
	2.Scrapped			
7. Value received at the period of disposal (If the asset was sold, write down the sales price that was actually obtained from selling (and not the residue value in account ledgers). <b>If the sales price is not known, write down "X."</b> If the asset was scrapped, write down the asset's sales price as scrap, if known, and <b>write down "X" if this price is not known.</b> )				
8. Note (e.g. "The sales price of this building includes land price." "The sales price was not recorded for each asset ")				

\*Red area may differ from *Survey on Capital and Repair Expenditures* in Canada in 1997.

# Another Property of CED-Disposal Survey

## – Asset classification in CED-Disposal Survey (ESRI,2007)

- About 600 assets (We constructed the [asset-code search system](#), so that reporters could search the 5-digit code in this asset classification using some particular keywords on the website)

	Number of assets	639
1. Buildings		66
2. Equipment attached to buildings		41
3. Structures		47
4. Machineries		172
5. Transportation equipment		56
6. Other machinery and equipment		257

- At present, we are still checking if the reported code of asset is appropriate. Maybe, the elementary classification of assets can be somewhat aggregated if not feasible.
- Asset-Product Concordance: This asset classification can be connected to about 350-400 machineries & equipment in the elementary-level commodity classification of JSNA-Commodity Flow. (JSNA-Commodity Flow has about 2200 commodities except buildings and constructions.)

# Why Assets are Disaggregated ? (1)

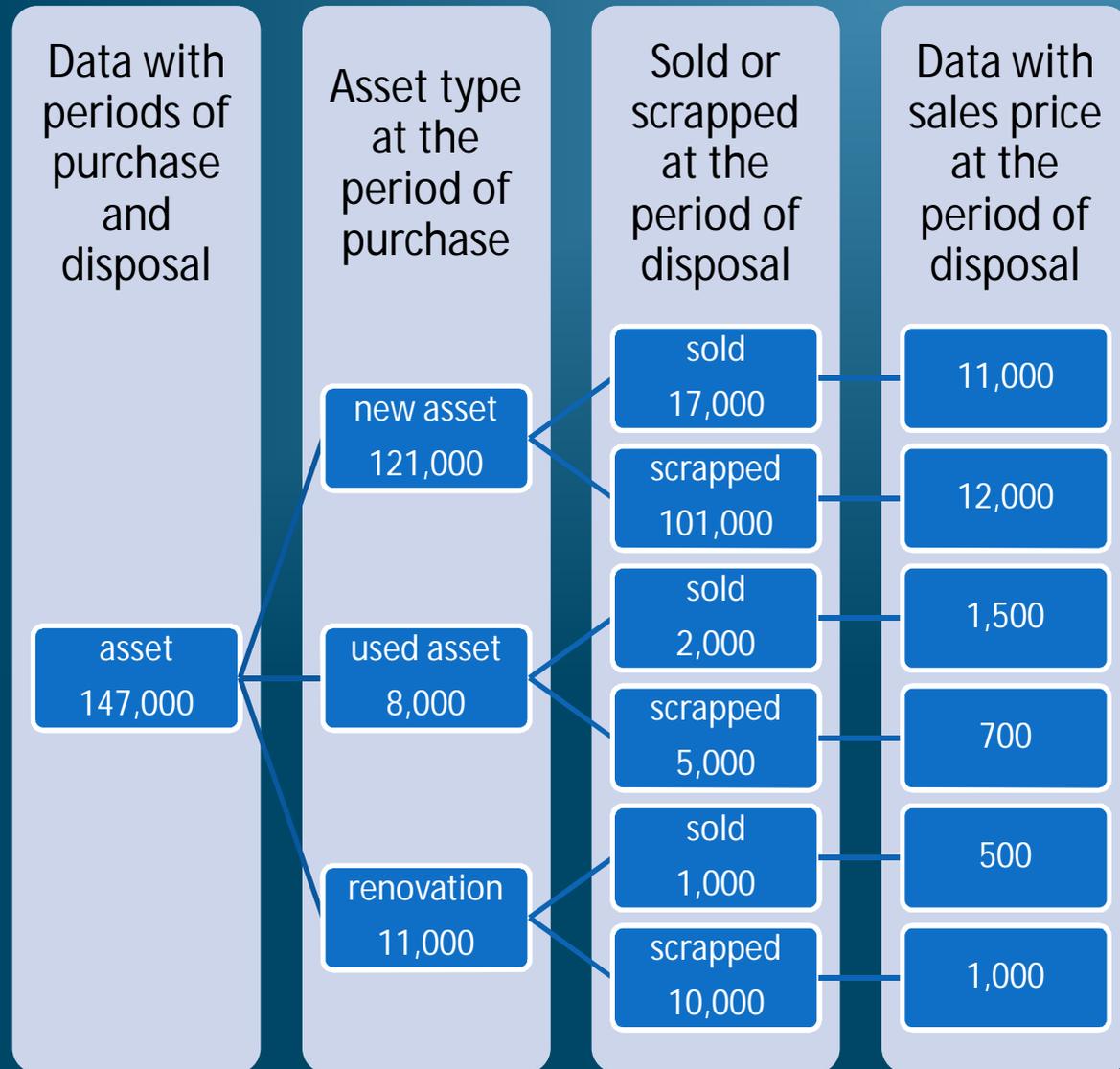
- To control the difference in assets that belong to the same group of assets
  - Building itself and some facilities annexed to the building may have considerably different service lives.
  - 7% of the samples classified to buildings (except its facilities) still have service lives with shorter than 3 years (e.g. temporally constructed dwellings for exhibition).
  - Considerable diversity of service life of machineries, reflecting the rapid changes in technology and business environment (e.g. semiconductor machinery). The choice of discard does not necessary depend on physical durability.
  - Disaggregation may make it easier to apply the same parameters at elementary level to the past. Reflecting the components of assets in the past, the aggregates service life can be computed. (hopefully, may apply them to other countries)

# Why Assets are Disaggregated ? (2)

- To connect with assets observed at physical units
  - It makes possible to roughly check the estimated surviving assets (GCS) with the existing assets that were directly observed at physical units (e.g. dwellings, special machinery for medical care, education facilities, social facilities, bridge, highway, road, other infrastructure, and so on). In particular, it may be easy to check the allocation of the assets among regions based on indirect and direct estimates.
  - Also, maybe easier to connect with material flow (link with environmental studies, recycle analysis, etc.)

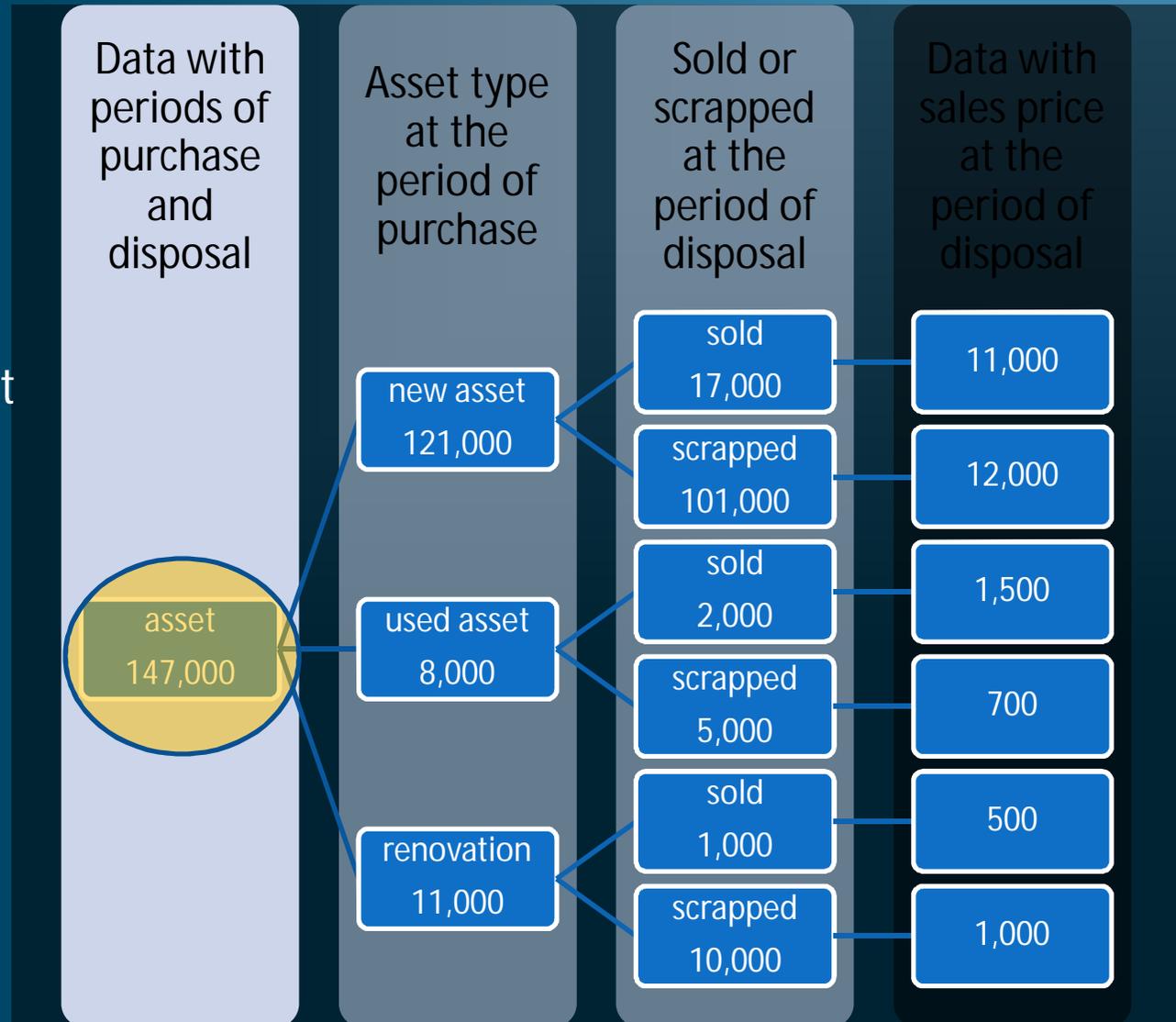
# Collected Disposal Data in CED : Number of Collected Samples

- We are still checking the validity of the data collected in CED (ESRI,2007)
- At present : about 147,000 assets with periods of purchase and disposal was collected. (In the preliminary survey in 2003, about 10,000 data was collected.)



# Appropriate Data to Estimate Survival Function? (1)

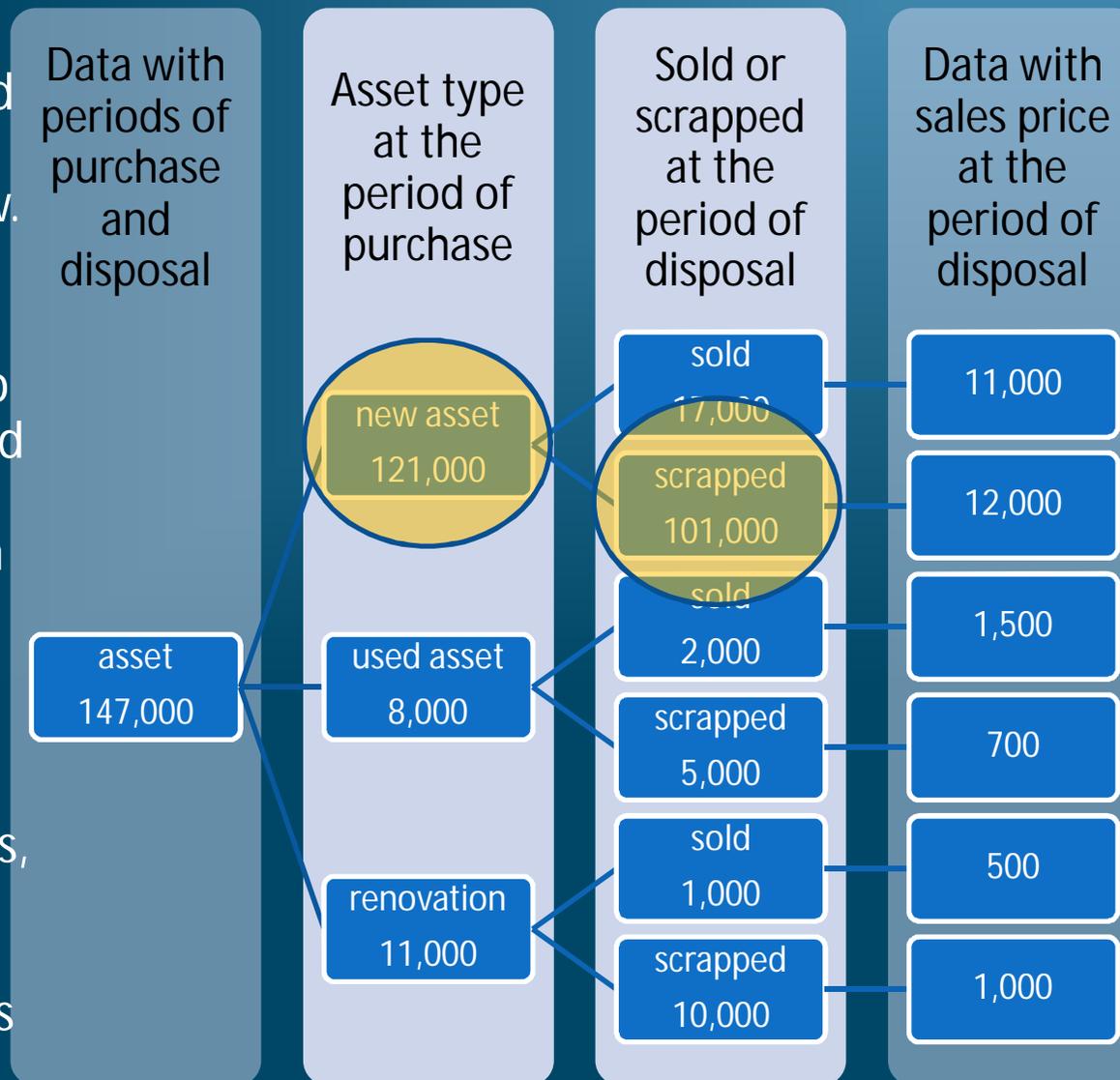
This type of discard/disposal data may be sometimes used to estimate ASL. But, it is obvious that it underestimates ASL, since it includes the assets purchased as used assets.



# Appropriate Data to Estimate Survival Function? (2)

Left one is disposal data and right one is discard data. The discard data seems good to estimate ASL from the engineering point of view. But, sometimes hard to distinguish (some assets sold as used assets are to be exported and scrapped in foreign countries, e.g. ships: about \$300 million in 2004). It may be less reason to exclude sold assets for owners.

$\delta$ (APP for a cohort) may not have to reflect sold assets, since "the value of the asset sold, bartered or transferred is recorded as negative GFCF" in SNA



# Sensitivity in Average Service Life

## -Very Preliminary Results-

- In the case of dwellings owned by corporations

Asset type at the period of purchase	ASL	
1. New assets	31.4	26.7 (sold)
		36.2 (scrapped)
2. Used assets	14.2	
3. Renovation/Repair	22.6	
All	29.9	

ASL was computed as the average weighted by the purchased values reevaluated by constant prices.

- There are significant difference in ASLs of new or sold assets. The ASL of used assets is 14.2 year, almost half of that of new assets (31.4).
- But, if asset type at the period of purchase is not controlled, the bias (31.4→29.9) may be not so serious in this case (where 16% of the total value is for used assets and 6% for renovation).
- There is a significant difference in ASLs of sold or scrapped assets. (26.7 or 36.2 respectively)

# Not-Fully-Controlled Discard Data Tends to Overestimate $\delta$ ?

- These can be possible explanations of the seem-too-high  $\delta$  in Canada?
  - The discard/disposal data may include not only new assets, but also used assets at the period of purchase. This must overestimate  $\delta$ .
  - There can be a considerable number of sold/scrapped assets, the sales prices of which are not available and reported (thus, these are treated as if they were scrapped). In CED 2007, the sales prices are not available in 35% of the sample of sold assets. Also, the value of scrapped assets are frequently not available. If so, this may seriously overestimate  $\delta$ .
  - The aged-asset prices must be defined as purchaser's price, not price received by seller. (or should extract the margin, installation cost, or ownership transfer cost from the acquisition cost) If not, it may overestimates  $\delta$ .

# Future Plans

- Further collection of disposal data
  - ESRI implemented the 2<sup>nd</sup> CED in December 2007/January 2008.
- Corresponding investment series
  - The long-term constant-price investment series in each asset should be constructed, corresponding to the Commodity Flow. It is also used to reduce the sample biases of disposal data.
- Asset classification
  - It may be better to reclassify assets for measuring stock based on the difference in durations of assets, e.g. investment of buildings includes buildings-attached-facilities , but it can be decomposed based on its components (described as intermediate inputs)  
: INV redefined-INV GCS/PCS/NCS
  - Better connection (in the long-run, integration ) of asset classification between corporate accounts and national accounts is required. If possible, it will be a big next step for obtaining better estimates of capital. (also important for intangibles)

Thank you very much

Comments welcome

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