

Income Estimation for Workers in Synthetic Population for Real-Scale Social Simulations

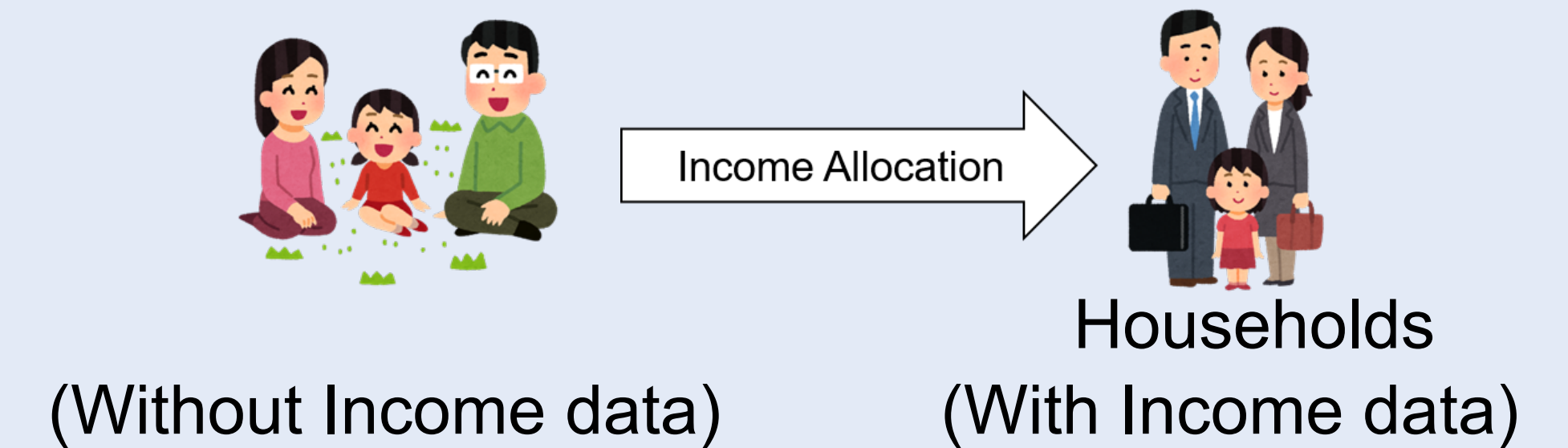
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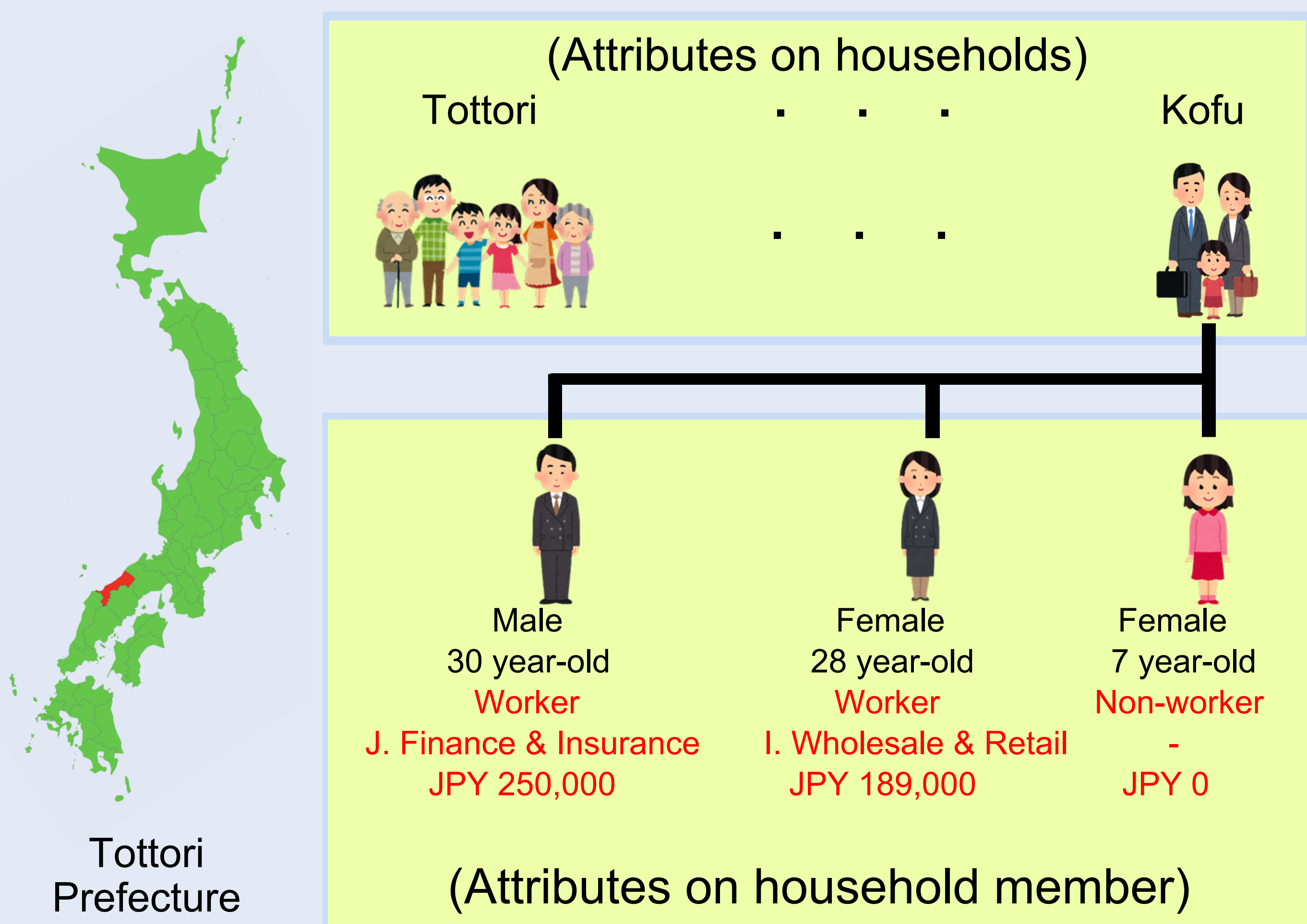
Introduction

In RSSS, it is important how much the household afford the activity they decide.

We allocate income to each worker by industry type.



Synthetic Population



Statistics on the Num. of Workers

Attribute	Stat. a	Stat. b	Stat. c	Income
Sex	Male, Female	Male, Female	Male, Female	Male, Female
Age	15, 16, ..., 101	15-20, ..., 75-	-	15-20, ..., 75-
Family type	17 categories	5 categories	-	-
Industry type	-	20 categories	20 categories	16 categories
City type	-	-	Each city in Tottori Prefecture	Tottori Prefecture
Working status	-	-	-	A Full-time worker
The number of workers	252,963	283,775	287,332	(Sample Survey)

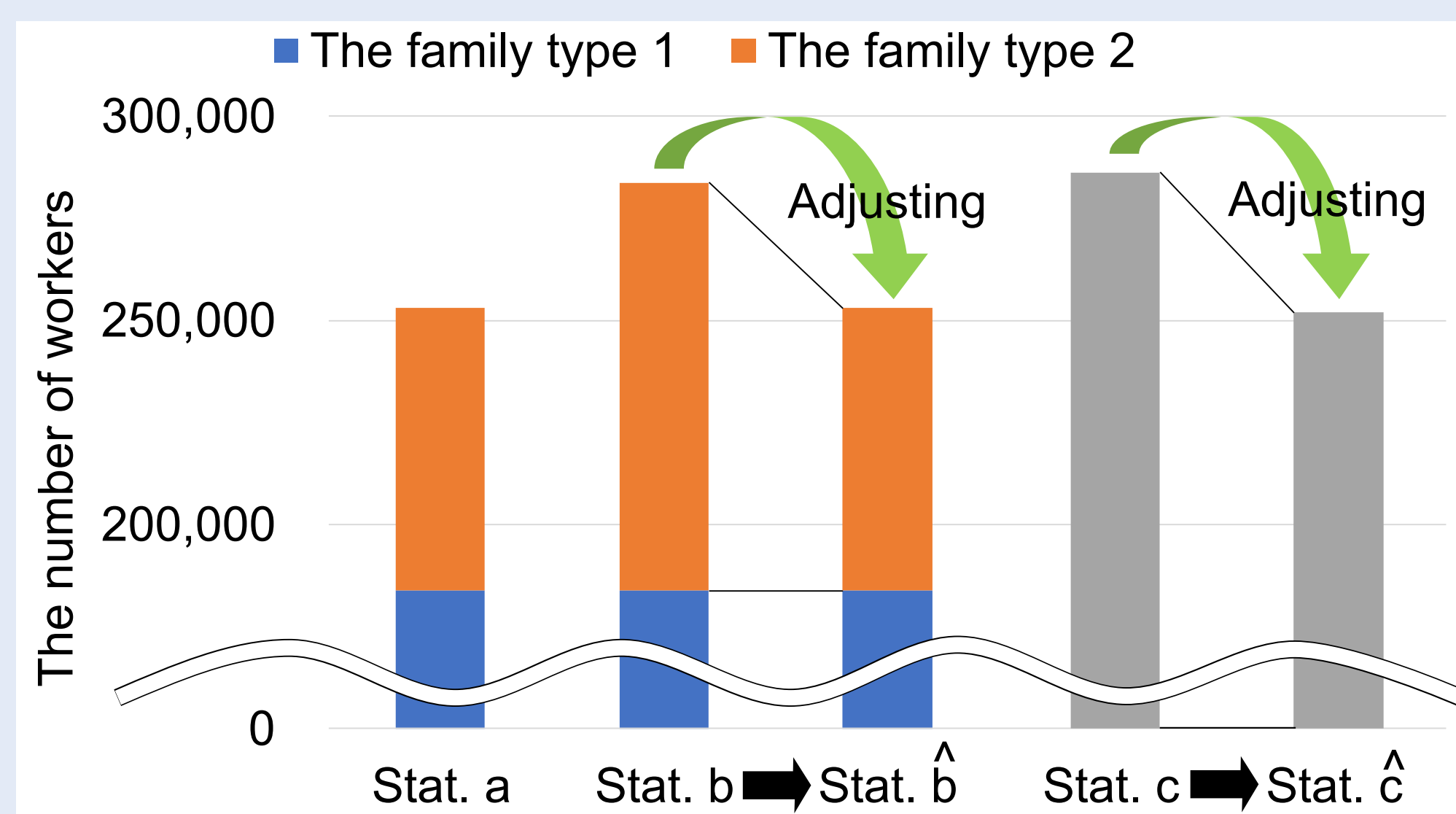
Note 1: Stat. a, Stat. b, and Stat. c are tables on 2010 Population Census.

Note 2: Income is a table on BSWs (Basic Survey on Wage Structure) on June, 2010.

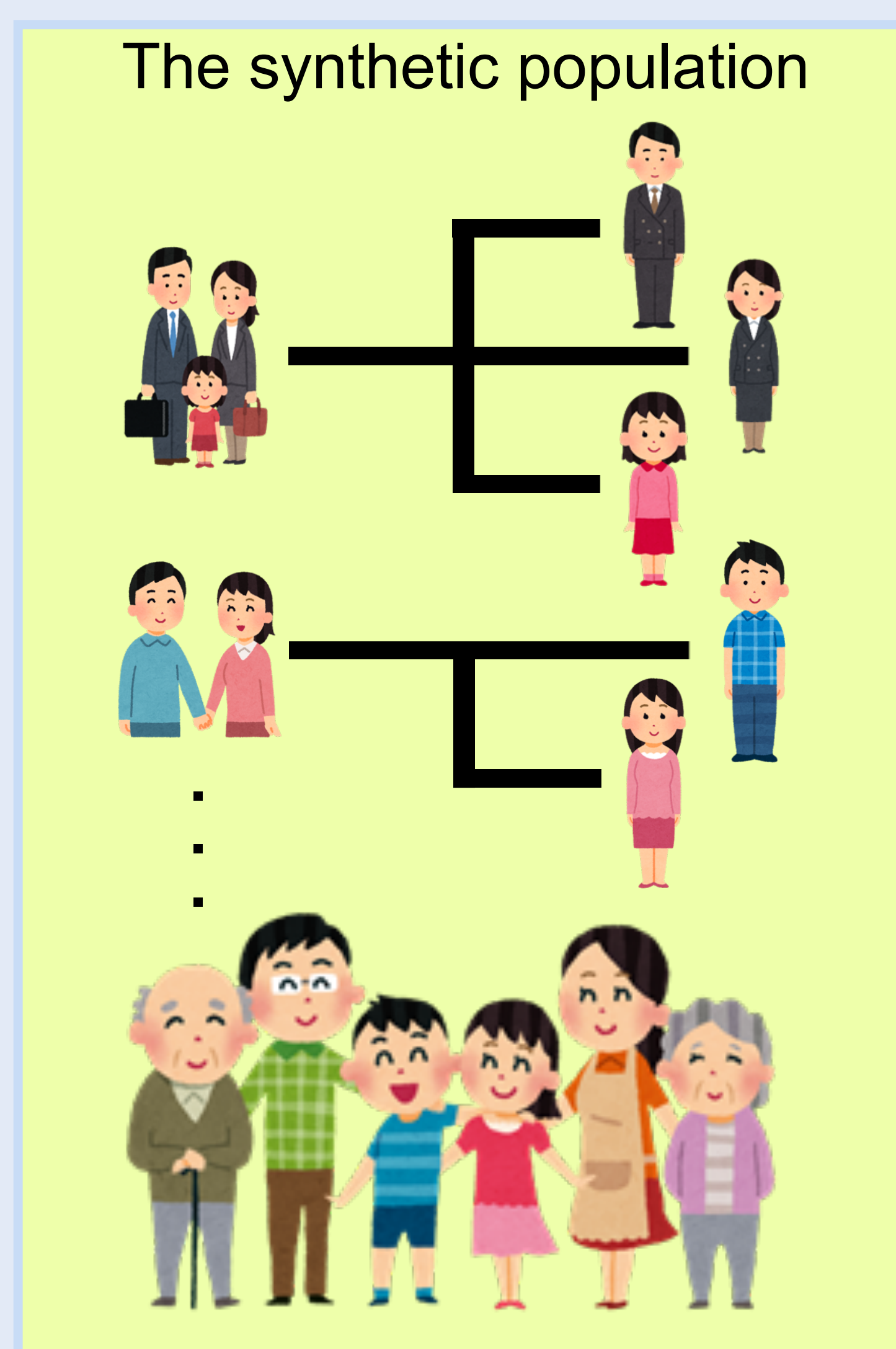
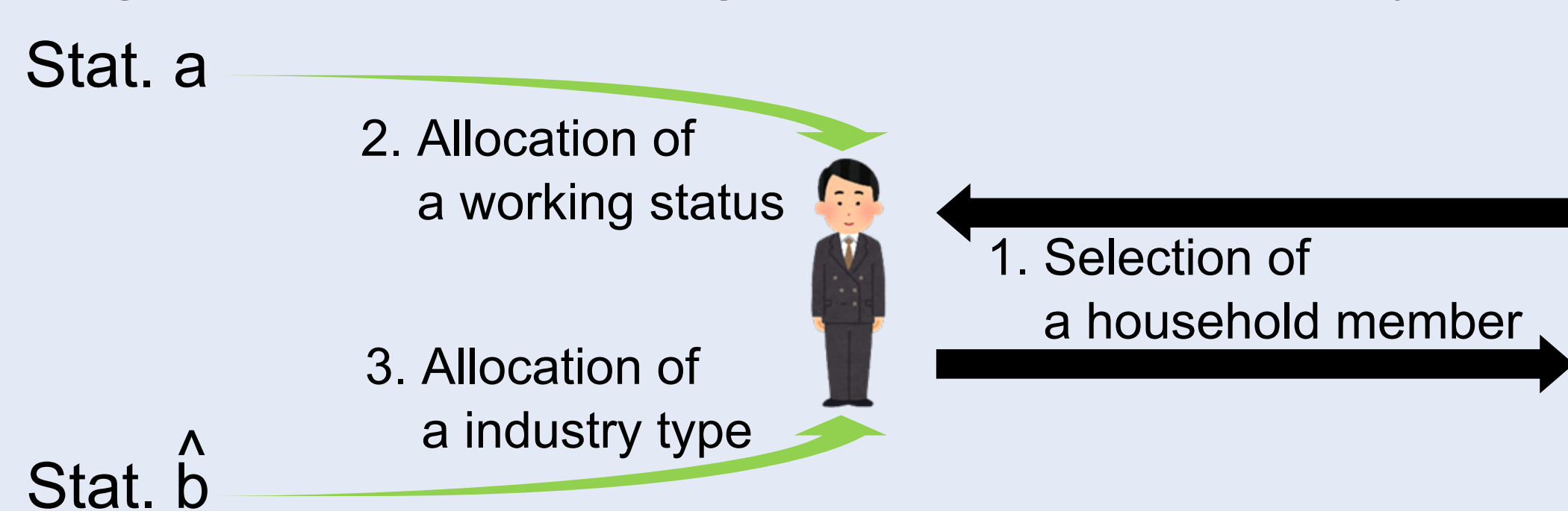
Note 3: Synthesized family types is 9 categories following the previous study.

I. Initialization

Adjustment Procedure on Real Statistics



Assignment of Working Status and Industry

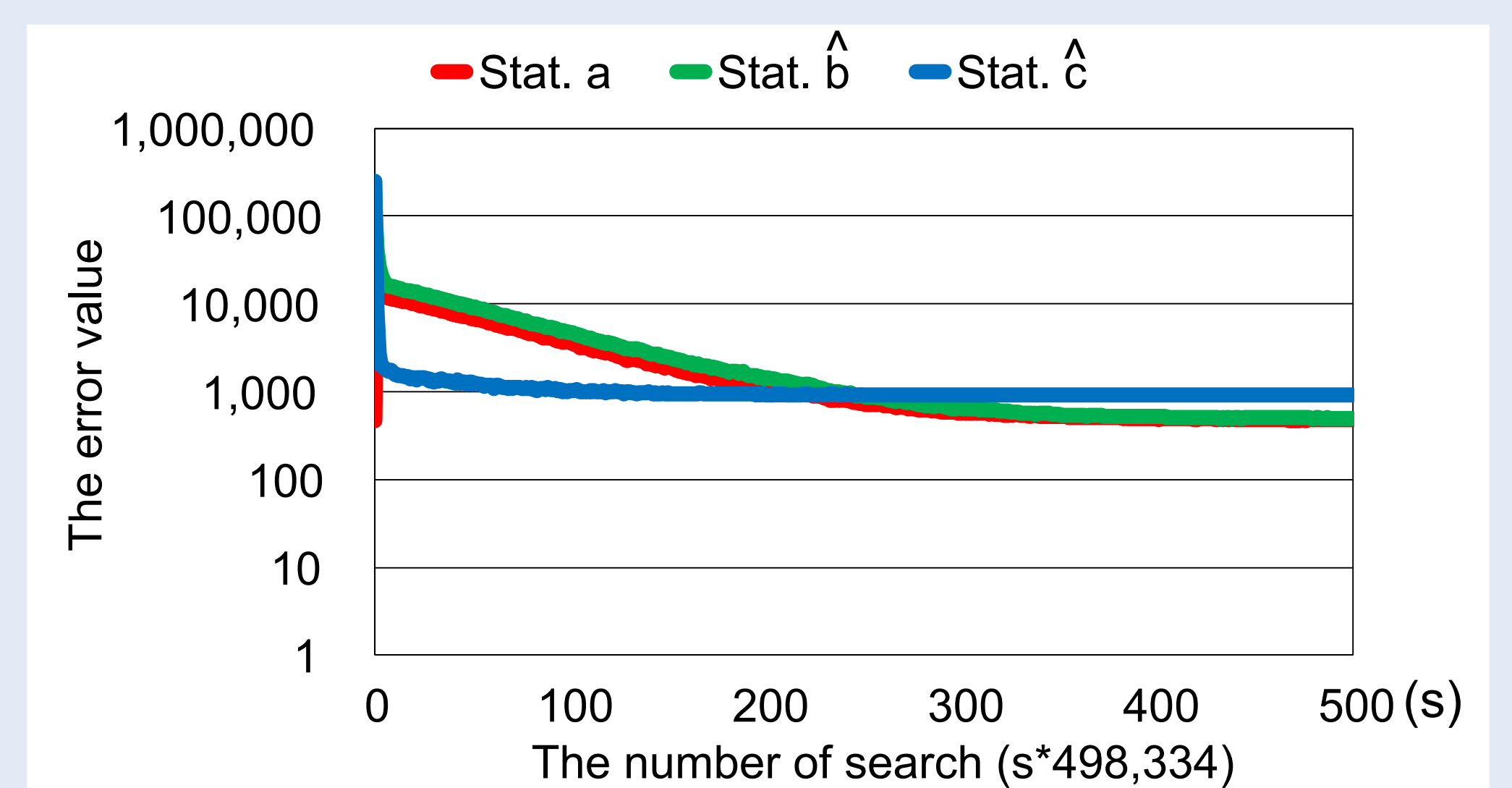


II. Error Minimization

Application of a Simulated Annealing

1. Selection of a household member
2. Attribute exchange
 - Working status
 - Industry type
3. Error calculation
4. Transition

Total difference on each statistics



III. Results

Industry type	BSWS (JPY)			MLS (JPY)		
	Proposed Method	%		Proposed Method	%	
M Accommodation & Restaurants	207,143	189,762*	-8.4%	112,213	189,762*	69.1%
N Amusement Services	231,562	211,921*	-8.5%	157,132	211,921*	34.9%
O Education	337,750	325,470*	-3.6%	338,610	325,470*	-3.9%
P Medical & Health Care	241,381	261,251*	8.2%	227,143	261,251*	15.0%
Average	254,536	248,436*	-2.4%	222,679	248,708*	11.7%

*: $t(9) = 2.262$, $p < .01$. (The method is a two-sided t-test)

Note 4: MLS is Monthly Labor Survey in Tottori.

Conclusion

We proposed the method to allocate income to each worker by industry type in synthetic populations using Basic Survey on Wage Structure that includes the income by working type.

The synthetic population includes the household member whose income is zero.

The average income is calculated with such workers. Therefore, we need to analyze the average income considering the worker whose income is more than zero.